

GRSM

THE FLORA OF
GREAT SMOKY MOUNTAINS NATIONAL PARK:
AN ANNOTATED CHECKLIST OF THE VASCULAR
PLANTS AND A REVIEW OF
PREVIOUS FLORISTIC WORK

RESEARCH/RESOURCES MANAGEMENT REPORT SER-55

U.S. DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
SOUTHEAST REGION

UPLANDS FIELD RESEARCH LABORATORY
GREAT SMOKY MOUNTAINS NATIONAL PARK
TWIN CREEKS AREA
GATLINBURG, TENNESSEE 37738



The Research/Resources Management Series of the Natural Science and Research Division, National Park Service, Southeast Regional Office, was established as a medium for distributing scientific information to park Superintendents, resource management specialists, and other National Park Service personnel in the parks of the Southeast Region. The papers in the Series also contain information potentially useful to other Park Service areas outside the Southeast Region and may benefit independent researchers working within units of the National Park System. The Series provides for the retention of research information in the biological, physical, and social sciences and makes possible more complete in-house evaluation of non-refereed research, technical, and consultant reports.

The Research/Resources Management Series is not intended as a substitute for refereed scientific or technical journals. However, when the occasion warrants, a copyrighted journal paper authored by a National Park Service scientist may be reprinted as a Series report in order to meet park informational and disseminative needs. In such cases permission to reprint the copyrighted article is sought. The Series includes:

1. Research reports which directly address resource management problems in the parks.
2. Papers which are primarily literature reviews and/or bibliographies of existing information relative to park resource management problems.
3. Presentations of basic resource inventory data.
4. Reports of contracted scientific research studies funded or supported by the National Park Service.
5. Other reports and papers considered compatible to the Series, including approved reprints of copyrighted journal papers and results of applicable university or independent research.

The Series is flexible in format and the degree of editing depends on content.

Southeast Regional Research/Resources Management Reports are produced by the Natural Science and Research Division, Southeast Regional Office, in limited quantities. As long as the supply lasts, copies may be obtained from:

Natural Science and Research Division
National Park Service
Southeast Regional Office
75 Spring Street, S.W.
Atlanta, Georgia 30303

NOTE: Use of trade names does not imply U.S. Government endorsement of commercial products.

THE FLORA OF GREAT SMOKY MOUNTAINS NATIONAL PARK:
AN ANNOTATED CHECKLIST OF THE VASCULAR PLANTS
AND A REVIEW OF PREVIOUS FLORISTIC WORK

Research/Resources Management Report SER-55

Peter S. White

Uplands Field Research Laboratory
Great Smoky Mountains National Park
Twin Creeks Area
Gatlinburg, Tennessee 37738

February, 1982

Department of the Interior
National Park Service
Southeast Regional Office
75 Spring Street, S. W.
Atlanta, Georgia 30303

White, Peter S. 1982. The Flora of Great Smoky Mountains National Park:
An Annotated Checklist of the Vascular Plants and a Review of
Previous Floristic Work. U.S. Department of the Interior, National
Park Service, Research/Resources Management Report SER-55. 219 pp.

ACKNOWLEDGEMENTS

Documenting the flora of a large and diverse area like Great Smoky Mountains National Park is never the work of a single individual. This report is based on my three years of field work and herbarium research, but it also builds on over 50 years of botanical collecting by previous investigators. Among the pioneer collectors were Albert Ruth, H. M. Jennison, A. J. Sharp (still active), and Arthur Stupka; present-day botanists who have contributed to the collections described in this checklist include Tom Patrick, Jerry Jenkins, Charles Bryson, Leo Collins, Matt Hickler, George Ramseur, Ken Rogers, Rudi Becking, and J. Dan Pittillo. I would like to thank naturalists Don DeFoe, Bill Hooks, and Glenn Cardwell for valuable plant records. Rob Sutter and Paul Somers aided my search for rare plant records. I thank Jerry Jenkins for helpful discussions on Aster, Solidago, and Viola and Tom Patrick for review data on Trillium. I would like to also thank Gene Wofford, curator, for frequent use of the University of Tennessee Herbarium (where a duplicate set of park collections is kept). I thank also the curators of the herbaria at the following universities which I visited during the course of this work: Western Carolina University, University of North Carolina at Chapel Hill, Duke University, North Carolina State University, Gray Herbarium (Harvard University), and the herbarium of the Smithsonian Institution. Some of the records herein were brought to my attention by the computerized data bases of the Tennessee Valley Authority and the Tennessee and North Carolina Heritage Programs. I would also like to thank the Great Smoky Mountains Natural History Association, which supported my travel to several herbaria and which also supported a project to computerize the park's herbarium label data. Claryse Myers and Kitty Manscill helped my research in the Great Smoky Mountains National Park library and archives. My wife, Carolyn, is also to be thanked for the generous grants of evening, weekend, and vacation time, without which I would not have been able to complete this work. Finally, I would like to thank Nicki Macfarland for typing the manuscript, Lee Anne Renfro for assisting in proofreading, and Jim Wood for editing the manuscript.

ABSTRACT

One hundred-seventy additions (163 species and seven additional taxa of infraspecific rank) to the vascular flora of Great Smoky Mountains National Park in North Carolina and Tennessee are presented in an annotated checklist. These additions increase the park's known vascular flora by 13 percent to 1,492 taxa (1,438 species plus an additional 54 infraspecific taxa). There are 135 families and 574 genera. The largest families are Asteraceae (162 species), Poaceae (132 species), Cyperaceae (94 species), Rosaceae (79 species), and Fabaceae (72 species). Eleven percent of the flora is contained in the five largest genera: Carex (69 species), Panicum (27 species), Viola (26 species), Aster (20 species), and Solidago (19 species). Two hundred-ninety-eight species of woody plants are included (21 percent of the flora). The checklist includes 288 exotics (20 percent); the woody flora is 23 percent exotic. The 163 species new to the flora include exotics (42 percent of the additions) and graminoids (18 percent). Eighteen native woody plants (11 percent) are also included (e.g., Amelanchier sanguinea, Betula cordifolia, Celastrus scandens, Decumaria barbara, Ilex verticillata, Magnolia macrophylla, Smilax bona-nox, and Spiraea virginiana). Among the other native additions to the flora are: Asplenium ruta-muraria, Carex pedunculata, Carex platyphylla, Dodacatheon meadia, Draba ramosissima, Euphorbia purpurea, Juncus trifidus var. monanthos, Millium effusum, Potamogeton amplifolius, Swertia caroliniensis, Thelypteris simulata, and Xyris torta). Four families (Cannabaceae, Lemnaceae, Potamogetonaceae, and Xyridaceae) and 41 genera new to the park are included. Supplementary lists also are presented for excluded species, status of 35 plants listed by Hoffman based on locales outside the park, additional plants in the Chilhowee flora and the five counties around the park, woody plants, status of exotic plants, and exotic plants of developed areas.

TABLE OF CONTENTS

	<u>Page</u>
ACKNOWLEDGEMENTS	i
ABSTRACT	ii
LIST OF TABLES AND FIGURES	iv
INTRODUCTION	1
REVIEW OF PREVIOUS CHECKLISTS AND PLANT RECORDS	2
The Pepoon Checklist (1931)	2
Jennison Checklists (1937-1939)	4
A. J. Sharp Checklists (1942-1975)	9
Royal Shanks Checklists (1947-1961).	10
Arthur Stupka Records (1935-1961).	11
Frank H. Miller Records (1937-Present)	12
The H. L. Hoffman Checklist (1964, 1966b)	13
Miscellaneous Checklists and Records	14
Other Sources of Information	15
METHODS: CRITERIA FOR SPECIES INCLUSION	17
Herbarium Research	17
Geographic Scope	18
"Unmappable" Locales	19
Exotic Species: Criteria for Inclusion and Examples	22
Excluded Species	26
RESULTS AND DISCUSSION	26
The GRSM Flora: Summary Statistics	26
Additions to the Checklist	27
Plant Distribution in GRSM	32
Regional Diversity	37
Threats to the flora	39
Future Work.	42
CHECKLIST FORMAT	43
THE ANNOTATED CHECKLIST	47
Pteridophyta	47
Spermatophyta	53
Gymnospermae	53
Angiospermae	54
Monocotyledoneae	54
Dicotyledoneae	82
LITERATURE CITED	168
APPENDICES	177

LIST OF TABLES AND FIGURES

<u>Table</u>		<u>Page</u>
1.	Early contributors to the GRSM Herbarium	5
2.	Species listed by Jennison (1939b) but not presently known from the flora of GRSM	8
3.	The largest families and genera in GRSM	28
4.	Families with the largest numbers of exotic species in GRSM	28
5.	Selected, phytogeographically important additions to the GRSM flora since the work of Hoffman (1964, 1966b)	31
6.	Northern species in the GRSM flora	33
7.	Representative species of special habitats and distributions in western GRSM	35
8.	Representative species more common in or restricted to eastern GRSM, southern GRSM, and higher elevations in the Clingmans Dome-Mount LeConte-Charlies Bunion area	36
9.	Southern Appalachian endemics in the GRSM flora	38
10.	Threats to the GRSM flora	40
 <u>Figure</u>		
1	Location and general geography of GRSM	20

INTRODUCTION

The first published vascular plant checklist for Great Smoky Mountains National Park was that of H. L. Hoffman (Hoffman 1964; additions and corrections to the 1964 list were published in Hoffman 1966b). Since that time, our knowledge of the park's flora has increased through further collecting and critical review of herbarium specimens. The goals of the present checklist are (1) to incorporate some 170 additions (ca 13 percent) to the checklist, including several important rare species (18 of these additions were discussed in White 1982); (2) to review nomenclature and identification of specimens based on recent floristic works unavailable to Hoffman (Radford et al. 1968; Cronquist 1980; Wofford and White 1981); (3) to present the first checklist annotated with habitat and abundance (park managers are directly concerned with assessment of rarity and threats to specific habitats); (4) to update the list of park exotic plants; and (5) to unambiguously assess the flora found within the confines of Great Smoky Mountains National Park (GRSM) itself (Hoffman listed not only plants found in the park but also plants found within an irregular zone around the park).

Before presenting the current checklist, previous checklists will be reviewed. I will then describe the methods used in constructing the present checklist and the format of the list. Major floristic patterns will be discussed. In addition to the checklist, several supplementary lists are included (Appendices I-VII): (I) Excluded species, (II) Status of plants listed by Hoffman based on specimens outside GRSM, (III) Plants in the Chilhowee Mountain flora (Thomas 1976) not yet known within GRSM (this list is of relevance to management of the Chilhowee section of the Foothills Parkway), (IV) Additional species found in the five-county area that includes GRSM (relevant to parkway development around the park), (V) Woody

species of GRSM, (VI) Exotic plants in the park flora, and (VII) Exotic plants known only in cultivation in park developed areas. These appendices will be summarized in the discussion.

REVIEW OF PREVIOUS CHECKLISTS AND PLANT RECORDS

The present checklist is based entirely on herbarium specimens. However, published and unpublished materials on the park's flora were also reviewed. These materials are discussed below to indicate both sources of information and potential sources of confusion concerning the park's flora. The older checklists will be reviewed in an approximate chronological order, from oldest to most recent.

The Pepoon Checklist (1931)

Hermann S. Pepoon, a Chicago-area high school biology teacher and author of an early flora of that region, collected plants during three trips to the Great Smoky Mountains: April 28 - May 5, 1928, April 1-10, 1930, and April 19 - September 1, 1931. It was during the latter trip that he began assembling a list of species for the area, periodic summaries of which appear in the 1931 Superintendent's Monthly Reports (GRSM Archives). The full list was eventually typed on 3- by 5-inch index cards by Dorothy Lexau (Gatlinburg; donated to the park 2/15/47) and is extant in the Park Herbarium.

The card file lists 1,445 species, among them records of plants currently undocumented in the park's flora. Some of these are certainly misidentifications (e.g., Juniperus communis, Smilacina stellata), but others are distinctive plants that Pepoon almost certainly knew well (e.g., Arisaema dracontium, Dirca palustris, Jeffersonia diphylla, Stylophorum diphyllum). Some of Pepoon's range descriptions are in error (e.g., he cites Carpinus caroliniana as extending to high elevations, and mountain-ash is said to be

"rare"). A few of the records are from locales outside the present park boundaries (e.g., Aesculus glabra) and so are of less importance to this report.

Herbarium specimens are of fundamental importance in evaluating Pepoon's list. Unfortunately, it is unclear if a full set of Pepoon's collections survive. Pepoon's field notes (including some hand-drawn maps) and some of his collections are located at the Illinois Natural History Survey Herbarium at the State Museum of Natural History (Urbana, Illinois). However, a check by the curator there revealed that specimens could not be found of many species (e.g., Picea alba, Picea mariana, Tsuga caroliniana, Arisaema dracontium, Lilium grayii; Kenneth Robertson, personal communication). Some Pepoon specimens were present (Aesculus glabra from southeast of Gatlinburg (outside the park) and Quercus imbricaria from Cades Cove), but the whole collection is evidently not intact.

At least one important specimen is extant in the Pepoon collections. This is Thelypteris simulata, collected by Pepoon in August 1931 from "summit elevation, damp woods near New Found Gap," Sevier County, Tennessee (Moran 1981).. This is the first record of this taxon in Tennessee, and a range extension of some 600 km from its nearest locale in West Virginia. It has not been rediscovered in the 50 years since Pepoon's collection. Moran (1981) argues that it cannot be the result of a labeling error or misidentification.

Spot checks of specimens at the Chicago Field Museum, University of Chicago, Morton Arboretum, and University of Illinois Herbarium did not yield any additional Pepoon specimens from the Great Smoky Mountains. Pepoon's collections date from just before the 1934 Morrill Hall fire that destroyed the herbarium at the University of Tennessee. They thus represent an important resource of early collections. It is likely that most of the unusual records in Pepoon's card-file are misidentifications; however, it is

also possible that additional significant records will be discovered.

During the mid-1930's, Pepon exchanged several letters with Park Superintendent J. R. Eakin (unpublished materials in GRSM archives). However, no additional information was disclosed on the existence of Pepon's collections. In 1963, Park Naturalist Arthur Stupka wrote to C. E. Olmsted of the University of Chicago concerning Pepon's collections, again with a negative result. More recently, Park Interpreter Don DeFoe tried to locate, at the Chicago Field Museum, specimens of Lilium grayii collected by Pepon, also without success.

Jennison Checklists (1937-1939)

Henry Milliken Jennison, a University of Tennessee plant pathologist, was hired to collect the park flora and supervise the creation of a herbarium during the early years of park establishment. Jennison spent three full years on leave from the University (1935-1937) and two summers (1938-1939) working as a wildlife technician for the National Park Service. His collections (together with those of the student interns he supervised) form the bulk of the older material available at the University of Tennessee and park herbaria and are the primary source for Hoffman's later checklist (Hoffman 1964, 1966b).

A numerical catalogue of GRSM collections for the years 1935-1937 survives in the Park archives (Anon. 1937). This manuscript contains collection numbers, dates, species, and general locales of collection. The first section (collections 1-4537) does not identify collectors; the second section lists the important early collections of A. J. Sharp (collections S-1 to S-477); and the third section lists the collections of T. G. Harbison (H-1 to H-181) and H. K. Svenson (Sv-7052 to Sv-7439). A herbarium report from 1937 has been used to prepare the summary of early collections that is presented in Table 1.

Table 1. Early contributors to the GRSM Herbarium.

Year	Collector	No. of Collections
1934	A. J. Sharp	480
	T. G. Harbison	110
1935	H. M. Jennison	1,160
	Lane Barksdale	250
	D. C. Bain	200
	R. J. Fleetwood	200
	S. L. Wallace	200
	H. K. Svenson	50
1936	H. M. Jennison and J. G. Smith	1,110
	Lane Barksdale	185
	J. R. Raper	175
1937	H. M. Jennison	400

Before his untimely death in 1940 (Cain and Hesler 1940), Jennison published several general descriptive articles on the park's flora (Jennison 1933, 1934, 1939a) and a few more detailed botanical papers (Jennison 1929, 1935a, 1938a). Much more valuable in an assessment of the park's flora than his published works are his unpublished manuscripts (Jennison 1935b, 1937a, 1937b, 1938c, 1939b; Barksdale and Jennison 1935) preserved in the GRSM library and archives. Other Jennison materials are preserved in the park archives as well--monthly reports, photographs, memos, letters, a phenological index, and field notebooks. The following discussion evaluates these published and unpublished manuscripts.

Jennison (1929) presented a list of species for all of Tennessee (spring flowers and ferns), but no locale data are given and no specimens cited. Jennison (1935a) presented more useful data, discussing 12 species from GRSM: Carex ruthii, Cyperus dipsaciformis, Hypericum graveolens, Hypericum mitchellianum, Juncus gymnocarpus, Lycopodium porophyllum, Potentilla recta, Ribes lacustre (later redetermined as R. cynosbati), Rubus tennesseanus (type

specimen from GRSM), Thelypteris phegopteris, Trichomanes petersii, and Viola renifolia (a Gattinger record, lost in the Morrill Hall fire, which Jennison feels was in error). Jennison also reported that he could recall no valid specimen of Thelypteris phegopteris in Gattinger's collections destroyed by the Morrill Hall fire. Thus, he felt Gattinger's (1901) citing of that plant was in error.

Jennison (1938a) described a new variety of Trillium: T. erectum var. blandum; the type locale was outside the park, but sites inside the park are noted.

Jennison's unpublished manuscripts are valuable as the first thorough assessment of the park's flora; in addition, his checklists are, for the most part, based on extant specimens. (However, some species are listed as "likely to be found in" GRSM or are based on specimens destroyed in the Morrill Hall fire of 1934.) Particularly valuable is Jennison's "Preliminary catalog of the flowering plants and ferns of the Great Smoky Mountains National Park" (Jennison 1939b), which listed 1,353 species. All Jennison manuscripts were reviewed for citations of plants not currently known from GRSM. Herbaria at GRSM and the University of Tennessee were searched for specimens corresponding to the names on the list. In some cases this was facilitated because Jennison had cited specimens by collector and number. In preparing his catalogue, Jennison filled out a series of herbarium inventory cards, one per species (a handwritten and typed set survive)--these sheets also assist the evaluation of Jennison's 1937 and 1939 lists.

After eliminating cases of nomenclatural change and misidentification (e.g., Clethra alnifolia, Gaylussacia dumosa, Pyrola americana), the novel species on Jennison's checklist fall into three categories: (1) Those found outside GRSM, as shown by label data; (2) those known only in cultivation in

GRSM; and (3) those for which no specimens can be found (Table 2).

Like the Pepon records, the latter form an intriguing list, but there is no evidence on which to include them in the park's flora. Particularly interesting are Asclepias obovata, Aster priceae, Brassica nigra, and Carex conjuncta, for which Jennison cites specimens lost in the Morrill Hall fire. Several species for which no older specimens can be found have, nonetheless, been documented by recent collections in the park: Amaranthus retroflexus, Ludwigia decurrens, Pastinaca sativa, Ranunculus bulbosus, Scirpus validus, and Xyris torta.

Jennison (1939b) also included an "Addenda" with "excluded species." The following species (all of them of phytogeographically important taxa) bear information of more than passing interest and so are quoted in full here (none of these taxa are currently known in the park flora):

- Buckleya distichophylla--"Years ago (about 1925) the writer transplanted a few plants and planted a few seeds of this species under some hemlocks along the old trail to LeConte, via Rainbow Falls at about 3000 ft. (He has never since relocated the site)."
- Cornus canadensis--"In April 1938, Mr. Karl Steinmetz of Knoxville, Tenn. showed the writer the exact spot where he had seen this species growing several years ago, then a cool shaded river bank just below where Sam's Creek joins the Lynn Camp Prong of the Little River, at Tremont."
- Erigenia bulbosa--"May possibly be found in our area."
- Orontium aquaticum--"The late Horace Kephart listed this species as occurring in general vicinity of Bryson City."
- Shortia galacifolia--"Not in our area."
- Tsuga caroliniana--"Should be sought in and near the Plott Balsams; Cataloochee Divide and vicinity."

Jennison was evidently intending to name new taxa in his manuscript (1939b), as indicated by the phrases "species novo," "var. novo," "n.f.," and "novo form." These occur for taxa in the Gregory Bald Azalea complex, a Rhododendron of Andrews Bald, and a form of Trillium erectum. Several "New comb." citations indicate that Jennison also intended to publish new combinations for GRSM taxa (e.g., for Rhododendron minus, Vaccinium stamineum, and Phacelia bipinnatifida). None of these nomenclatural changes appear necessary at present.

Table 2. Species listed by Jennison (1939b) but not presently known from the flora of GRSM.

Species based on locales outside GRSM	Species Known from cultivation only	No specimens extant
<i>Cardamine rotundifolia</i>	<i>Cosmos bipinnatus</i>	<i>Alnus rugosa</i> ¹
<i>Cheilanthes alabamensis</i>	<i>Cosmos candatus</i>	<i>Asclepias obovata</i> ²
<i>Fothergilla gardenii</i>	<i>Impatiens balsamina</i>	<i>Aster priceae</i> ²
<i>Paronychia argyrocoma</i>	<i>Lagerstroemia indica</i>	<i>Brassica nigra</i> ²
<i>Trichomanes boschianum</i>	<i>Lycoris squamigera</i>	<i>Caltha palustris</i> ¹
	<i>Melia azedarach</i>	<i>Carex conjuncta</i> ²
	<i>Nicotiana tabacum</i>	<i>Carex longii</i>
	<i>Petunia axillans</i>	<i>Catalpa bignonioides</i>
	<i>Petunia violacea</i>	<i>Collinsonia verticillata</i>
	<i>Raphanus raphanistrum</i>	<i>Coreopsis latifolia</i>
	<i>Ricinus communis</i>	<i>Euphorbia mercurialiana</i> ¹
	<i>Zea mays</i>	<i>Fraxinus quadrangulata</i> ¹
		<i>Hesperis matronalis</i>
		<i>Hydrastis canadensis</i> ¹
		<i>Phalaris canariensis</i>
		<i>Polygala incarnata</i>
		<i>Polygonum arifolium</i>
		<i>Saxifraga virginiensis</i> ¹
		<i>Scutellaria parvula</i>
		<i>Senecio pauperculus</i>
		<i>Silphium terebinthinaceum</i>
		<i>Solidago aquarrosa</i>
		<i>Zygadenus glaberrimus</i>

¹Jennison himself notes lack of specimens to document taxon.

²Jennison cites specimens lost in 1934 Morrill Hall fire at Univ. of Tennessee.

A. J. Sharp Checklists (1942-1975)

A. J. Sharp began his career in the Botany Department of the University of Tennessee in 1929 and is now Professor emeritus there. He has been active in Southern Appalachian botany for over 50 years. He has contributed many important records (e.g., his collection is the only specimen of Crotalaria purshii from both the park and the State of Tennessee). A set of his collections formed the beginnings of the GRSM Herbarium (see Table 1) in 1934, the year before Jennison was able to start his collections for the Park Service.

Sharp wrote several manuscripts listing the park's flora, including checklists of the trees (Sharp 1942a), woody and semi-woody shrubs and vines (Sharp 1942b), and pteridophytes (Sharp 1942c). Sharp described habitat and abundance in these lists.

Sharp's lists are based on herbarium material, making their review straightforward. After changes in nomenclature are taken into account, there are only a few listed plants which have not been included here. Some are based on specimens outside the park (e.g., Fothergilla gardenii). Among the shrubs, only Cornus stolonifera is listed by Sharp but excluded here; specimens in herbaria are all C. amomum (which Sharp also listed). Among the ferns, Asplenium pinnatifidum is listed with the note, "check on specimen in herbarium--coll. by Ralph Garrett at Tremont Junction (1200 ft)." I have seen no specimen of this taxon from the park.

Sharp also contributed "A preliminary and artificial key to the Pilgrimage wildflowers" (no date, typescript, 23 pages), later revised as "Key to the identification of spring wildflowers of Great Smoky Mountains National Park" (1975, typescript, 23 pages). Two plants which have not yet been documented in the park are listed in these manuscripts: Acer saccharinum (known both

as a cultivated and native tree just outside our boundaries), and Saxifraga virginensis (known outside the park).

Sharp's direct interest in the park's flora also is revealed in his notes and letters in the park archives. Among these is a letter to Ralph J. Zaenglein (8/28/52) in which Sharp described a locale for Hymenocallis occidentalis in Lower Abrams Creek gorge. A reference to this plant also occurs in the herbarium summary sheets (see Jennison Checklists above): "Plants without flowers have been seen in the Abrams Creek gorge and near the lake at Montvale by me (A. J. Sharp). While they cannot be identified without flowers, it is probable that they they are H. occidentale." No herbarium specimen documents this plant in our flora, and it has not been listed here.

Sharp's published work is also pertinent to the flora of the park (see Sharp 1931, 1937, 1941, 1955, 1957, 1963; Wagner and Sharp 1963; Sharp and Baker 1966). Among other important manuscripts are vascular plant checklists for Tennessee (Sharp et al. 1956, 1960). Plants found in the park are starred (*) on these lists, and they formed the basis of Hoffman's later work. These starred plants were also reviewed in the preparation of the current checklist (see Appendix I for the species which are not included in the present checklist).

Royal E. Shanks Checklists (1947-1964)

Shanks, an ecologist at the University of Tennessee, contributed several manuscripts and publications on Tennessee woody plants. Two of these directly concern the park's flora (Shanks 1954b, 1961). Based on herbarium specimens, a few plants on these lists cannot be accounted for: Rhus aromatica (known from one station just outside GRSM--see also Stupka (1964)), Acer saccharinum

(known both as a cultivated and native tree just outside GRSM), Fraxinus quadrangulata ("credited to the W. slope of Smoky Mts. by Sargent but the location doubtful"), Lycium halimifolium (no annotations), Solanum dulcamara (no annotations), and Catalpa bignonioides (no annotations; C. speciosa is also listed). The 1961 Shanks manuscript is the only source I have seen for the last three taxa listed. Shanks also provided notes for several difficult woody plant genera (Shanks 1947, 1953, 1957) in GRSM.

Shanks also published several papers on Tennessee woody plants (Shanks 1952a, 1952b, 1954a, Shanks and Sharp 1947, 1963); references to the park's flora are scattered in the first two of these publications. Summer keys to Tennessee woody plants are provided in Shanks and Sharp (1947); winter keys can be found in Billings et al. (1937). Shanks and Sharp (1963) presented a guide to Tennessee trees; they starred species found in the park. Among the trees for which there are no herbarium specimens for documentation are Broussonetia papyrifera, Melia azedarach, and Pyrus coronaria.

Arthur Stupka Records (1935-1964)

Stupka served as a park naturalist in GRSM from 1935 to 1964. During that time he kept valuable files on the park's flora. Included are field notes, reprints, copies of correspondence with botanists, and miscellaneous notes. These files record discovery of plants new to the park's flora (e.g., Melothria pendula, Arenaria serpyllifolia, and Botrychium matricariaefolium). A note in Stupka's files prompted me to check the Duke University Herbarium for a specimen of Juncus trifidus collected by W. B. Schofield; this specimen proved to be extant, and the plant was both a park and state record (White 1982). Other notes record plants not yet verified in the flora (e.g., Houstonia pusilla, seen by Mr. and Mrs. Frank Delaney, 6.4 miles from Headquarters along

Little River Road).

Several other records discussed under Jennison, Sharp, and Shanks above were discovered while I went through Stupka's files. Stupka also kept a natural history journal with important phenological information. His 1964 book summarizes data on the park's woody plants. Records in that work were evaluated here (see Checklist and Appendix V).

Frank H. Miller Records (1937-Present)

Miller was the director of an early vegetation survey of GRSM (1935-1939) and author of the only full vegetation map as yet constructed for the park (Miller 1942). Miller also wrote several manuscripts on the plants of the park (Miller 1937, 1939; Miller n.d.).

Miller has persisted in his interest in local botany, and he has frequently written to park interpreters with observations on the park's flora. Several noteworthy taxa are cited in his letters, often with detailed descriptions of identification and locale, which are presently undocumented in the park:

Carya aquatica (letters of 9/14/78, 10/12/79)--Miller recalled having seen this species in Cades Cove; he sent (9/25/80) me a map of the locale, but several searches were not successful. Carya cordiformis does occur in the mapped area.

Carya carolinae-septentrionalis (letter of 9/14/78)--Along the Happy Valley Road near the western boundary of the park. This taxon has also been collected in Blount Co., just outside the park (TENN).

Dirca palustris (letter of 12/8/76)--Swain Co., on old road to a CCC camp. Miller reports having seen the plant there in 1936.

Quercus nigra (letter of 9/14/78)--Planted near Fontana Dam, outside GRSM.

Rhus aromatica (letter of 9/14/78)--Near Fontana Dam, outside GRSM.

Vaccinium lamarckii (letter of 9/14/78)--Maggie Valley area; taxonomic status doubtful; probably outside GRSM as well.

The H. L. Hoffman Checklist (1964, 1966)

Hoffman's checklist (1964, 1966b) was based on an inventory of herbarium specimens at the University of Tennessee and Great Smoky Mountains National Park. It is thorough but suffers from three sources of error or confusion: (1) Not all herbarium specimens were critically reviewed for identification, (2) it was based on limited new collecting, and (3) it included plants collected near but not in the park. No checklist can be entirely free of these limitations--some groups of plants are, to date, poorly understood and some herbarium specimens are "unmappable" (it cannot be proved if they were collected inside the park or not). On point 3, however, revision was necessary because the plants included by Hoffman from outside the park occur in an irregular and unsystematic zone around the park (see Appendix II). Of course, the boundary of the park does not exactly coincide with the "Great Smoky Mountains" as a mountain system; however, Hoffman's area does not coincide with those natural boundaries either.

Hoffman et al. (1958) presented a generic and family checklist of the Great Smoky Mountains. It was a preliminary stage in his work on the full checklist. Hoffman (1966a) presented a general discussion of plant families of GRSM and compared taxonomic diversity to other published floras.

Because Hoffman's work was based on herbarium specimens, its review is essentially completed in the production of the new list (see also Appendices I and II). The records on Hoffman's list for which no specimens could be found (i.e., other than misidentifications or cases of synonymy) are given in Appendix I. Cases of nomenclatural change are given in the main checklist.

Hoffman's list contained "about 1450 entities" (actually 1451: 1,337 species and 114 additional infraspecific taxa were listed). Twenty-six species were listed in Hoffman (1966b); the remainder were in Hoffman (1964).

Of the 1,337 species, 1,302 were based on collections from inside GRSM. Of the 1,451 total taxa, 1,416 were based on collections from the park; of these, 1,322 have been retained here, though with some nomenclatural changes.

Miscellaneous Checklists and Records

At the Park Herbarium are eight checklists in card-file format: (1) A set entitled "Herbarium," (2) "Cades Cove flora--Green, 1937," (3) "Phenological data-GSMNP," (4) "Phenological data--H.M.J.," (5) "Index--trees, shrubs, and woody vines--GSMNP," (6) "H. S. Pepon - List GSMNP Flora, 1931," (7) "H. Kephart--Journal--trees and plants," and (8) "Condensed from herbarium file cards and various books on wild flowers and trees within the Park--Deas Boykin." These are briefly evaluated below, along with several additional archival manuscripts.

Card-file (1) is an index of the Jennison-era collections, one card per herbarium sheet, arranged alphabetically by genus. Card-files (2), (3), (4), and (8) are all based more or less directly on the Jennison-era collections. These five lists have been, therefore, assessed through review of all extant herbarium collections. (See also discussion under "Jennison Checklists" above.) No new data is contained which cannot be found on the herbarium labels or manuscripts that have already been cited. The nomenclature of these cards has not been brought up-to-date. A handwritten card-file index to park species is extant at the University of Tennessee Herbarium; it probably derives from the label data card-file as well.

The Cades Cove flora checklist (number 2 above) includes a wide area around Cades Cove (e.g., Lower Abrams Creek and Bote Mountain) and hence is a Cades Cove district checklist rather than one for Cades Cove per se. The file contains ca 680 species.

The Pepoon card-file (number 6 above) has already been discussed at length (see "Pepoon Checklist" above).

The Kephart card-file (number 7 above) is an index to plants mentioned in Horace Kephart's journal, arranged alphabetically by common name. Notes on phenology are given; the locale and habitat data are often vague. Several noteworthy plants are mentioned; for example, Marsh marigold (Caltha palustris) and Golden club (Orontium aquaticum). Neither are known from GRSM at present. No collections exist to document this list. As with the Pepoon list, most of the citations are probably in error.

In card-file (8) herbarium label data is summarized with a description of general habitat preferences. In general, no new information is contained that is not on the herbarium labels themselves, although a few additional species are cited (e.g., Spiraea prunifolia).

Lane Barksdale contributed a guide to GRSM orchids (Barksdale 1936). Several plants are noteworthy:

Corallorhiza maculata--"No recent collections of this species have been made from the Park. H. S. Pepoon reports it as growing on wooded slopes off Middle LeConte trail."

Lysias orbiculata (Habenaria orbiculata)--"Has not yet been located in the Park. It grows nearby in the Blue Ridge and can easily be expected to occur in an area such as Cataloochee. Because of the possibility of its occurrence it is included in this key."

Pogonia ophioglossoides--"Though the rose pogonia is found on both sides of the Park, collections of it have not been made from the state since 1898, at which time it was found growing near Mount Sterling."

The first two of these plants are currently unknown from the park; a specimen of Pogonia, collected by Albert Ruth, is still extant at the University of Tennessee Herbarium.

Other Sources of Information

Several publications give county records for the area that includes GRSM. These were searched for records relating to our five counties (Blount, Cocke,

and Sevier Counties, Tennessee; Haywood and Swain Counties, North Carolina). Any plants that were not on the checklist were noted and appropriate herbaria were searched to determine if the records in question were from inside or outside GRSM. The records based on the locales outside the park form the core of Appendix IV. A few additions to the checklist were discovered in these searches.

These sources included the county atlas of the North Carolina flora (Radford et al. 1965, 1968); the in-progress Tennessee county atlas (Wofford and Evans 1979a, 1979b; Wofford 1980); published additions to the flora of North Carolina (Leonard 1971; Mathews et al. 1974; Pittillo et al. 1969, 1972) and Tennessee (Rogers and Bowers 1969, 1971, 1973; Rogers and Underwood 1966, 1968; Chester 1975; Thomas and Chester 1967; Sharp and Baker 1966; Small and Barclay 1973; Wofford et al. 1972, 1977; Wofford and Dennis 1976; Dennis et al. 1980; Huber and DeLapp 1977); and state rare plant reports (Committee for Tennessee Rare Plants 1978; Cooper et al. 1977). Several monographic and floristic works which cite county records also aided the search for new records (e.g., Beatley 1973; Blomquist 1939; Blomquist and Correll 1940; Bryson 1980a, 1980b; Correll 1937; Freeman 1975; Horton 1972; Pringle 1967, 1977; Ramseur 1960; Reed 1936; Robinson 1960; Shanks 1941, 1952; Underwood 1936, 1945; Wells and Sharp 1966).

Older, more general floristic works for the area were also reviewed (Ball 1938; Boggess 1935, Gaylon 1928a, 1928b; Harper 1947, 1948, Maddox 1926; Shaver 1926; White 1939).

Data on rare plants from several Natural Heritage Programs were reviewed here: North Carolina, Tennessee, and the Tennessee Valley Authority.

METHODS: CRITERIA FOR SPECIES INCLUSION

Herbarium Research

Although the materials cited above furnished leads for herbarium research, taxa were not included on the checklist unless documented by herbarium specimens. The collections of Jennison, Sharp, and co-workers form the bulk of material available from the park's early years (ca 1934-1939); see Table 1). These plants were collected, in duplicate, under sponsorship by the National Park Service. One set is housed at the herbarium of Great Smoky Mountains National Park (in the checklist the acronym GRSM is used for the location of these collections--e.g., in Great Smoky Mountains National Park; "NPGSM" has been occasionally used in the literature to designate the herbarium itself). A second set of these collections is housed at the University of Tennessee Herbarium (TENN). GRSM specimens are kept in separate folders at the University of Tennessee; of course, additional material has been added in the 40 years since Jennison's work. Included in this material are collections of A. J. Sharp, Ken Rogers, Hal DeSelm, Tom Patrick, J. K. Underwood, and others. The park herbarium has also seen the incorporation of additional material--in particular, a set of voucher specimens of R. H. Whittaker, 2,000 of my own collections from the last four years, and miscellaneous other collections (e.g., those of Arthur Stupka, H. L. Hoffman, and Charles Bryson). The total number of separate collections in the holdings at GRSM and TENN for the park is ca 14,000. This is the primary resource on which this checklist is based.

Herbaria at the following institutions were also visited to search for park specimens: University of North Carolina, North Carolina State University, Duke University, Western Carolina University, Vanderbilt University, The

Smithsonian Institution, and Harvard University (Gray Herbarium).

Correspondence with colleagues revealed the presence of several key specimens at the Missouri Botanical Garden, Chicago Field Museum, Illinois Natural History Survey, and the Institute for Botanical Exploration, Mississippi State University. Literature discussed above was the primary source of taxa checked at these herbaria (see also Appendix IV).

The earliest collections seen are from the 1880-1890 period (including important collections of Albert Ruth and Beardslee and Kofoed). There are few collections between 1900 and 1934, primarily due to the Merrill Hall fire that destroyed the University of Tennessee Herbarium on January 18, 1934. The Scrophulariaceae (figwort family) were out of the herbarium at the time; nearly all other specimens were lost, including important collections of August Gattinger (author of an early state flora; Gattinger 1901) and Albert Ruth (extant Ruth specimens at TENN were purchased after the fire from Ruth's daughter).

Several species have not been seen since their original collection in GRSM: Arabis laevigata var. burkii, Bromus ciliatus, Chelone obliqua, Crotalaria purshii, Elymus riparius, Helianthemum bicknellii, Lilium grayii, Linnaea borealis, Lycopodium annotinum, Lysimachia fraseri, Pogonia ophioglossoides, Silene rotundifolia, Sparganium androcladum, Symplocos tinctoria, Thaspium pinnatifidum, and Thelypteris simulata. The checklist includes these records; they should be objectives of continued field work.

Geographic Scope

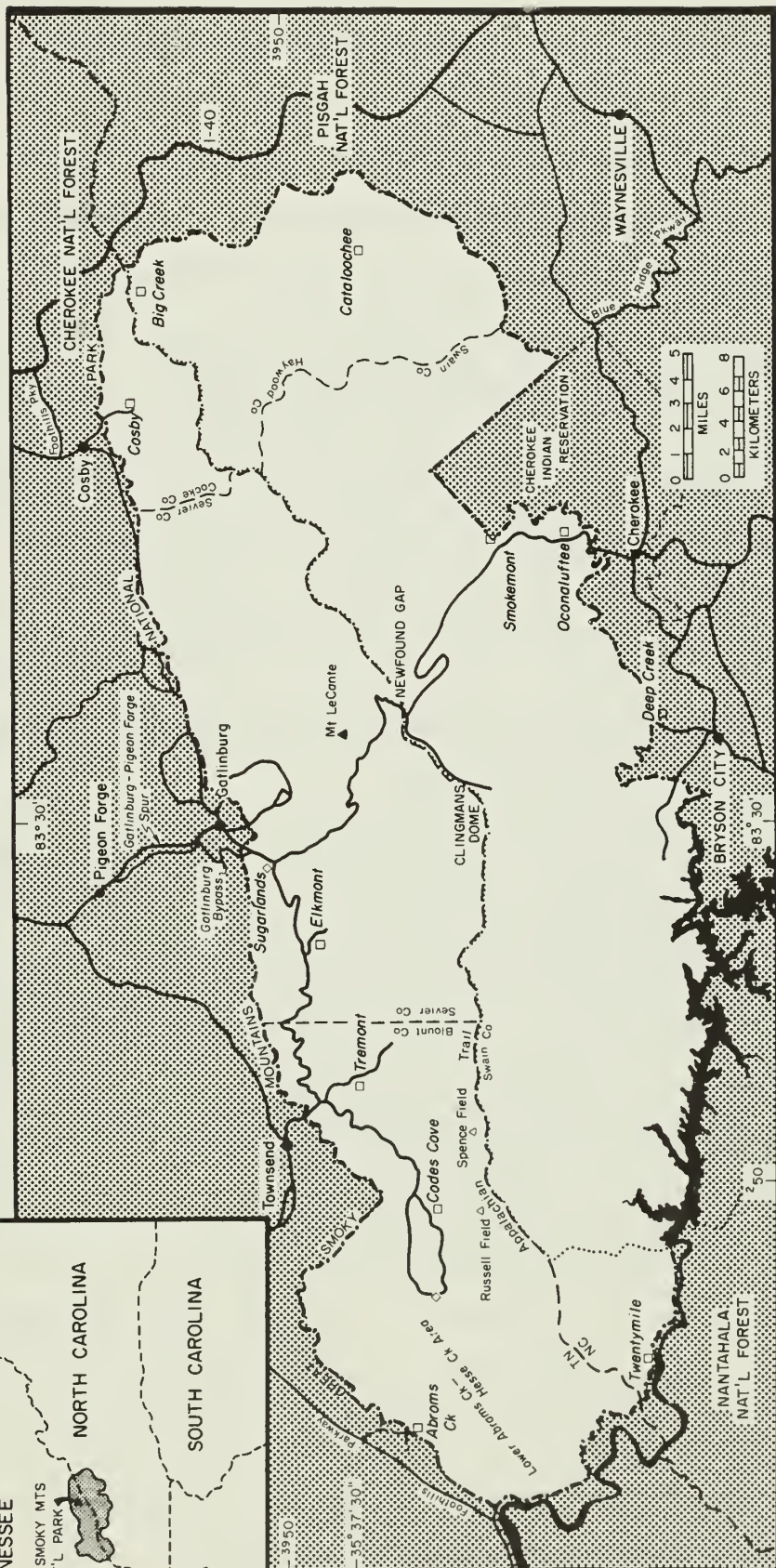
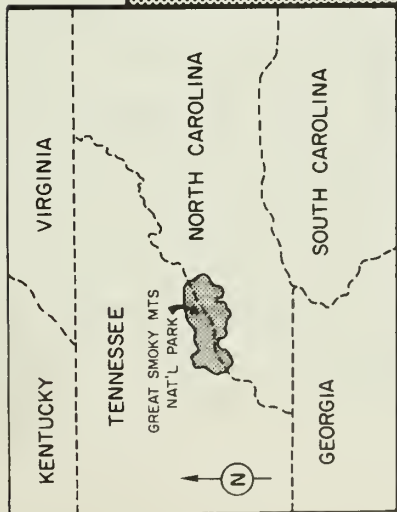
Plants are included on this checklist if they are found within GRSM proper, exclusive of the Foothills Parkway (incomplete and, except for Chilhowee Mountain (Thomas 1976), not well collected), the Gatlinburg spur

road, and Gatlinburg bypass (Fig. 1). Records of plants near but not in GRSM are presented in Appendix II (from Hoffman's list), Appendix III (from Thomas' (1976) Chilhowee Mountain flora), and Appendix IV (additions for the five-county area surrounding the park). These lists have been included to provide information on regional plant diversity, to aid future assessment of parkway development, and to avoid ambiguity in plants deleted from earlier GRSM checklists (see also Appendix I, "Excluded species"). All of Hoffman's records that were based on plants originally collected outside the park are evaluated in Appendix II; 19 of the 35 species have been recently collected within the park.

"Unmappable" Locales

Several older collections, and a few more recent ones, bear label data that do not supply enough information to place the collections definitely within the park (some older collections predate the formation of the park itself; also, park boundaries have varied through time and there were several different proposed park configurations during the 1930s). A number of these collections have been included on the checklist: Bromus secalinus ("near Gatlinburg"), Coreopsis auriculata ("near Gatlinburg"), Erodium cicutarium ("near Cherokee"), Justicia americana ("outside Townsend"), Lilium grayii ("open woods, Swain Co., 3000-6000 ft."), Linnaea borealis ("mountain woods, Sevier County"), Lysimachia fraseri ("near Gatlinburg"), Pogonia ophioglossoides ("Mt. Sterling"), and Thaspium pinnatifidum ("hillside, Swain Co., 2000 ft, Flora of the Great Smoky Mountains"). These species were included because they were based on the common use of phrases such as "near Gatlinburg" for a wide area (e.g., for the north slope of the Great Smoky Mountains). One "unmappable" species, however, was not included in this checklist: Trillium pusillum var. pusillum. The label data for this species

Figure 1. Location and general geography of GRSM. This checklist includes the park proper but not the Foothills Parkway, Gatlinburg Spur and Bypass, nor Blue Ridge Parkway near the park.



reads "Mts. of Haywood Co.". Freeman (personal communication) feels there are several likely explanations that would put that plant outside park boundaries: It was in a mixed collection, it may have been from cultivated plants, and there are more appropriate wet sites outside than inside the park in Haywood County. It remains to be found within GRSM.

Exotic Species: Criteria for Inclusion and Examples

The checklist contains 288 species (20 percent of the flora) which are not native to GRSM. These have been marked with an asterisk (*) in the checklist and their place of origin has been given ("Native to ..."). They have been extracted from the main checklist as Appendix VII, where their general status in the park's flora is also presented. The percent of exotics in the GRSM flora is within the range for other Eastern North American areas (ca 10-30 percent; see Fernald 1950).

The checklist includes two main categories of exotic species: (1) those which appear spontaneously in the flora (that is, are reproducing by seed, and (2) those which are persistent after cultivation (for example, at old homesites) but which do not, as yet, appear to be self-seeded in the park. The latter plants were included in the checklist only if they occur in the main part of the park, exclusive of developed areas or private inholdings. Exotic plants known only from such developed areas (park residences, ranger stations, administrative buildings, visitor centers) or private inholdings (e.g., Elkmont) and not reproducing by seed are listed in Appendix VII. The plants on that list are not likely to be encountered by most park visitors. On the other hand, exotic plants persistent at old homesites are frequently encountered and thus were included in the main checklist. Examples of various categories of exotic plants are given below.

Species persistent after cultivation in the park and not spreading by seed ("P" in Appendix VI) include 42 species (15 percent of all exotics), of which the following are representative: Acer platanoides, Forsythia suspensa, Gymnocladus dioica, Hydrangea paniculata, Spiraea vanhouttei, Thuja orientalis, and Zanthoxylum americanum. Such plants do not appear to be becoming established and will eventually disappear as the originally planted individuals die (though this may require ca 30-150 years of uninterrupted succession). As long as the older individuals remain there is, in addition, the potential that some species will eventually establish seedlings.

Other exotic species, also persistent after cultivation, have locally expanded their populations either vegetatively or by seed ("P+S" in Appendix VI). Forty-two species (15 percent of park exotics) are in this category. Among the ones that spread vegetatively are Ajuga reptans, Buxus sempervirens, Hedera helix, Heimerocallis fulva, Narcissus pseudo-narcissus, and Vinca minor. Species which have spread locally by seed include Aquilegia vulgaris, Berberis thunbergii, Ligustrum vulgare, and Lonicera morrowii. J. Dan Pittillo has reported seedlings of Picea abies in plantations of that species on Kephart Prong (personal communication); these may represent the only locale in the Southeast where this species is becoming established (Wilbur H. Duncan, personal communication).

Some species which have been noted as spreading from cultivated plants have not been seen in several decades and are doubtfully persistent at this time ("DP" in Appendix VI). Examples from the 22 species (8 percent of park exotics) in this category are Alchemilla microcarpa, Berberis vulgaris,

Centaurea cyanis, Delphinium ambiguum, Fagopyrum esculentum, Nuphar advena, Nymphaea odorata, and Phlox drummondii. Also included in this category are plants that, while recently collected, will probably not persist long (because they are short-lived, noncompetitive in succession, and dependent on continued seed brought in by man). Examples are the annuals Lycopersicon esculentum, Secale cereale, and Triticum aestivum. Some formerly cultivated plants were excluded from the checklist because they probably were never present as escapes (that is, herbarium specimens are probably from garden plants); Cosmos species, Nicotiana tabacum, and Zea mays are in this category (see Appendix I, Excluded Species).

The largest group of exotic plants are those which are established or are becoming established in the park flora ("E" in Appendix VI). This group includes 182 species (62 percent) of park exotics. Many of these have been here for over a hundred years; for example, Achillea millefolium, Dioscorea batatas, Holcus lanatus, Phleum pratense, Rumex acetosella, and Taraxacum officinale. Others are more recent arrivals; for example, importation of roadfill along Route 73 in 1980 resulted in the introduction of nine new species to the park flora, six of which were exotics: Amaranthus retroflexus, Cannabis sativa, Chenopodium murale, Echinochloa colonum, Panicum milaceum, and Setaria faberi.

Of course, most of the established or establishing exotics occur along roads, in fields and lawns, and in other disturbed habitats. Some are able to invade natural communities or to influence succession after disturbance in open communities and are of more concern. Spreading around old homesites and other places of human influence are Berberis thunbergii, Dioscorea batatas, Hedera helix, Ligustrum vulgare, Lonicera morrowii, Rosa spp., Symphoricarpos orbiculatus, and Vinca minor. In moist young woods, woods edges, and wooded

trailsides are Agrostis spp., Microstegium vimineum, and Perilla frutescens.

In wetland habitats and lower elevation streamsides (where flooding provides a natural disturbance) Dactylis glomerata, Echinochloa crus-galli, Holcus lanatus, Lysimachia nummularia, Mentha piperita, Mentha spicata, Nasturtium officinale, Polygonum persicaria, Rumex obtusifolius, and Setaria viridi

Several plants pose a particular threat because they spread and establish more aggressively: Ailanthus altissima (as yet a local problem in GRSM), Albizia julibrissin (along roads at low elevations), Lonicera japonica (fields, old homesites, young woods, moist areas, streamsides, lower elevations), Paulownia tomentosa (roadsides; also coming up in some remote areas in the Lower Abrams Creek area), and Pueraria lobata (the subject of ongoing management action on ca 85 separate plots).

Several plants have an ambiguous status in the park's flora. These are plants native in the general vicinity of GRSM but collected in the Park only near old homesites or other areas of human influence. Several of these were included on the exotics list (Acorus calamus and Lonicera sempervirens). Other similar species, though found at or near old homesites, are also known from seemingly native stations and were not included on the exotic list: Lilium canadense, Phlox paniculata, Vitis labrusca, Wisteria frutescens, and Yucca smalliana. Prunus munsoniana is treated as introduced, based on early descriptions (Sharp 1942b); Prunus hortulana, on the other hand, has been treated as native.

Another category of native plants also presents problems in assessing the park's exotic flora. These are plants which probably were not originally in the park flora but which have spread here with settlement (ca 1800-1930) or park development (ca 1930 to the present). Examples are Apocynum cannabinum, Asclepias syriaca, Calystegia sepia, and Physalis species. Although they are

found in recent, human-created habitats, they cannot be conclusively listed as exotic. They are certainly native around the park. Other native plants, though native in GRSM, have, nonetheless, greatly expanded their ranges with human disturbance: Ambrosia trifida, Aster species, Bidens species, Campsis radicans, Cyperus species, Erigeron species, Hypericum species, Oxalis stricta, Plantago rugelii, Polygonum species, Solidago species, and Vernonia gigantea are examples of these. Plants in this category were probably originally found in naturally open or disturbed habitats (streamsides, seepage meadows, marshes, dry open woods, and cliffs), from which they have spread into areas of human disturbance.

Excluded Species

Taxa previously attributed to the park, but for which there appears to be no valid herbarium specimens or which are known only from outside GRSM, are presented in Appendix I. Simple cases of misidentification or nomenclatural change are not always listed in that appendix. However, the checklist presents synonymy for both Hoffman's list and the flora of the Carolinas (Radford et al. 1968). The checklist also cites cases of previous misidentifications and recent systematic revisions. Appendix I and these notes reduce potential ambiguity in certain records of the park's flora. Among the species in Appendix I are 64 species that appeared on Hoffman's list.

RESULTS AND DISCUSSION

The GRSM Flora: Summary Statistics

The checklist includes 135 families, 574 genera, and 1,438 species. There are an additional 54 infraspecific taxa recognized, for a total of 1,492 taxa at the species level and below. Woody plants make up 298 species (21 percent

of the flora; see Appendix V). There are 57 pteridophytes (4 percent of the flora), 13 gymnosperms (1 percent), 356 monocots (25 percent), and 1,012 dicots (70 percent).

The flora includes 288 exotic species (20 percent of the total) plus two additional infraspecific exotic taxa. The exotic species are extracted as Appendix VI, where general status in the park's flora is given (see also discussion above). The woody flora is 23 percent exotic.

Grasses (Poaceae) and composites (Asteraceae) are the most important families in total species (Table 3) and exotic species (Table 4). Mustards (Brassicaceae), pinks (Caryophyllaceae), and knotweeds (Polygonaceae) are relatively more important in terms of exotic species than they are in total species (Tables 3 and 4). Sedges (Carex), panic grasses (Panicum), violets (Viola), asters (Aster), and goldenrods (Solidago) are the leading genera; 11 percent of the flora is in these five genera (Table 3).

Additions to the Checklist

Hoffman's list (1964, 1966b) included 1,337 species (1,302 based on collections from inside GRSM) and an additional 114 infraspecific taxa, for a total of 1,451 "entities." A number of herbarium sheets were misidentified in Hoffman's time.

The present checklist includes 1,322 taxa from Hoffman's list (however, nomenclatural changes have been made for some of these plants) that were based on specimens from GRSM. In Appendix I, I have discussed 59 deletions from Hoffman's list; in Appendix II, I have evaluated the 35 species that were listed by Hoffman based on collections from outside GRSM (24 were footnoted by Hoffman as outside the park, but he was apparently unaware of the remainder). Nineteen of the 35 species have been recently documented inside GRSM; they are counted here as additions to the checklist. The total number of deletions

Table 3. The largest families and genera in GRSM. The number of native species is shown in parentheses.

<u>Family</u>	<u>No.</u>	<u>Species</u>	<u>Genus</u>	<u>No.</u>	<u>Species</u>
Asteraceae	162	(135)	Carex	69	(69)
Poaceae	132	(91)	Panicum	27	(26)
Cyperaceae	94	(94)	Viola	26	(24)
Rosaceae	79	(59)	Aster	20	(20)
Fabaceae	72	(49)	Solidago	19	(19)
Liliaceae	56	(49)	Polygonum	15	(11)
Lamiaceae	41	(30)	Eupatorium	13	(13)
Ranunculaceae	37	(30)	Ranunculus	13	(9)
Scrophulariaceae	37	(26)	Rubus	13	(12)
Brassicaceae	31	(16)	Juncus	12	(12)
Ericaceae	29	(29)	Desmodium	11	(11)
Orchidaceae	29	(29)	Lespedeza	11	(7)
Apiaceae	28	(23)	Phlox	11	(9)
Violaceae	27	(25)	Poa	11	(8)
Saxifragaceae	26	(24)	Crataegus	10	(10)
Caryophyllaceae	25	(11)	Prunus	10	(6)
Polygonaceae	20	(12)	Quercus	10	(10)

Table 4. Families with the largest numbers of exotic species in GRSM.

<u>Family</u>	<u>No. of Exotic Species</u>
Poaceae	41
Asteraceae	27
Fabaceae	23
Rosaceae	20
Brassicaceae	15
Caryophyllaceae	14
Lamiaceae	11
Scrophulariaceae	11
Polygonaceae	8
Caprifoliaceae	7
Liliaceae	7
Ranunculaceae	7
Salicaceae	7

from Hoffman's list is thus 129 taxa (35 were based on locales outside GRSM and 59 were redetermined).

I have recognized only 47 of Hoffman's 114 additional infraspecific taxa. The reason for this decision is that, on the basis of herbarium material I have seen, the remaining taxa are not clearly distinct in GRSM. In the checklist notes and synonymy I have shown where, and often why, these decisions were made.

Additions to the checklist include 123 species and two additional infraspecific taxa from my own collections plus 40 species and five additional infraspecific taxa based on collections I have seen in herbaria, for a total of 163 species and 7 infraspecific additions--a 13 percent increase in the known vascular flora (these totals do not include nomenclatural changes).

Among the additions to the park flora are four families (Cannabaceae, Lemnaceae, Potamogetonaceae, and Xyridaceae) and 41 genera: Aegopodium, Ajuga, Alopecurus, Aneleima, Arabidopsis, Asparagus, Cannabis, Coeloglossum, Conringia, Decumaria, Dodacatheon, Eryngium, Erysimum, Fagopyrum, Gladiolus, Hydrocotyle, Hypochoeris, Lemna, Linnaea, Lunaria, Lycopersicon, Matelea, Matricaria, Medicago, Milium, Muscari, Ornithogalum, Parietaria, Pastinaca, Phyllanthus, Pogonia, Potamogeton, Rotala, Secale, Sherardia, Sonchus, Swertia, Synandra, Veronicastrum, Vittaria, and Xyris.

Of the total additions at the specific level, 42 percent are exotic and 18 percent are graminoid plants. This is readily understandable--some of the exotic species are only recently established in the park flora and graminoid plants are inconspicuously flowered. However, 18 native woody plants are included in the additions (11 percent) (e.g., Amelanchier sanguinea, Retula cordifolia, Celastrus scandens, Decumaria barbara, Ilex verticillata,

Magnolia macrophylla, Rhododendron bakeri, Robinia kelseyi, Salix caroliniana, Smilax bona-nox, and Spiraea virginiana). Seven native ferns are also included (Asplenium ruta-muraria, Botrychium oneidense, Dryopteris celsa, Thelypteris palustris, Thelypteris simulata, Vittaria sp., and Woodwardia virginica). Other native plant additions of note are listed in Table 5. Amelanchier sanguinea, Carex platyphylla, Milium effusum, Polymnia canadensis, Scirpus validus, and Synandra hispidula are known from several sites each; the remainder are known from only one locale.

The additions to the flora have come from several areas of the park. Foremost is western GRSM--Cades Cove and three other limestone windows, and the Lower Abrams Creek-Hesse Creek area (Fig. 1). This area includes habitats that are scarce in the park as a whole: wetlands, limestone outcrops, rocky stream gorges, TVA impoundment waters, and the lowest elevations in GRSM (down to ca 850 ft, 260 m). Limestone substrate additions to the checklist include: Asplenium ruta-muraria, Carex jamesii, Celastrus scandens, Dentaria multifida, Dodacatheon meadia, Hydrophyllum macrophyllum, Lithospermum canescens, and Swertia caroliniensis. Limestone outcrops in the 1700 to 1900 ft elevation range (520 to 580 m); hence, these species are low elevation species as well. Additions to the flora from wetlands include Scirpus validus and Xyris torta. Other western GRSM additions include: Amelanchier sanguinea, Carex platyphylla, Decumaria barbara, Desmodium paucifolium, Draba ramosissima, Gentiana saponaria, Gentiana villosa, Ilex verticillata, Magnolia macrophylla, Polymnia canadensis, and Potamogeton amplifolius. It is easy to understand why western GRSM has yielded so many additions--that area is, in a sense, peripheral to the central core of the park. However, there are additions from the central mid- and high elevations as well (e.g., Betula cordifolia, Coeloglossum viride var. virescens, Juncus trifidus var. monanthos, and Milium effusum).

Table 5. Selected, phytogeographically important, additions to the GRSM checklist since the work of Hoffman (1964, 1966b).

<u>Species</u>	<u>Family</u>
Amelanchier sanguinea	ROSACEAE
Asplenium ruta-muraria	ASPLENIACEAE
Betula cordifolia	BETULACEAE
Carex jamesii	CYPERACEAE
Carex pedunculata	CYPERACEAE
Carex platyphylla	CYPERACEAE
Celastrus scandens	CELASTRACEAE
Coeloglossum viride var. virescens	ORCHIDACEAE
Decumaria barbara	SAXIFRAGACEAE
Dentaria multifida	BRASSICACEAE
Desmodium paucifolium	FABACEAE
Dodacatheon meadia	PRIMULACEAE
Draba ramosissima	BRASSICACEAE
Dryopteris celsa	ASPIDIACEAE
Euphorbia purpurea	EUPHORBIACEAE
Gentiana saponaria	GENTIANACEAE
Gentiana villosa	GENTIANACEAE
Hydrocotyle americana	APIACEAE
Hydrophyllum macrophyllum	HYDROPHYLLACEAE
Ilex verticillata	AQUIFOLIACEAE
Juncus trifidus var. monanthos	JUNCACEAE
Linnaea borealis	CAPRIFOLIACEAE
Lithospermum canescens	BORAGINACEAE
Lycopodium annotinum	LYCOPODIACEAE
Lysimachia fraseri	PRIMULACEAE
Magnolia macrophylla	MAGNOLIACEAE
Milium effusum	POACEAE
Platanthera lacera	ORCHIDACEAE
Polymnia canadensis	ASTERACEAE
Potamogeton amplifolius	POTAMOGETONACEAE
Rhododendron bakeri	ERICACEAE
Scirpus validus	CYPERACEAE
Smilax bona-nox	LILIACEAE
Spiraea virginiana	ROSACEAE
Swertia caroliniensis	GENTIANACEAE
Synandra hispidula	LAMIACEAE
Thelypteris palustris	ASPIDIACEAE
Thelypteris simulata	ASPIDIACEAE
Veronicastrum virginianum	SCROPHULARIACEAE
Vittaria sp.	PTERIDACEAE
Woodwardia virginica	BLECHNACEAE
Xyris torta	XYRIDACEAE

Plant Distribution in GRSM

The flora of GRSM varies locally within the park. The changing flora is most conspicuous as one moves along the two dominant environmental gradients of the park: (1) There is a regular turnover of species with elevation (more northern species being found at higher elevations), and (2) there is a regular turnover of species within a given elevation as one moves from a moist cove site (concave topography) to a dry ridge site (convex topography). Examples of species turnover along these gradients are numerous; indeed, the flora cannot be understood without reference to elevation and site moisture factors. For example, on moist sites at lower elevations, Liquidambar styraciflua is a frequent tree; Aesculus octandra is frequent on moist sites at mid-elevations; and Picea rubens dominates moist sites at high elevations. Moving from a moist draw to a dry ridge at mid-elevations, a typical species sequence is Acer saccharum and Tilia heterophylla (coves), Robinia pseudo-acacia and Quercus prinus (intermediate sites), and Pinus pungens and Quercus coccinea (ridges). Trees, shrubs, herbs, and vines all show this kind of floristic turnover. The turnover is seen within genera as well (e.g., Aster, Solidago, Carex, Quercus, Carya, and others).

The Northern species in the GRSM flora are second only to Southern Appalachian endemics (see below) in terms of conservation importance and interest to naturalists. Representative Northern species are listed in Table 6. A few of them are plants found at or above tree-line in the New England mountains: Scirpus cespitosus var. callosus and Lycopodium selago. Juncus trifidus var. monanthos and Geum radiatum are Southern Appalachian endemics closely related to Northern, above tree-line species.

Disturbance to the vegetation, whether human or natural, forms an overlay to these gradients. Thus, in mesic old-growth stands at low to mid-

Table 6. Northern species in the GRSM flora.

<i>Acer spicatum</i>	<i>Linnaea borealis</i>
<i>Agrostis borealis</i> var. <i>americana</i>	<i>Lonicera canadensis</i>
<i>Amelanchier sanguinea</i>	<i>Lycopodium annotinum</i>
<i>Aster acuminatus</i>	<i>Lycopodium selago</i>
<i>Betula cordifolia</i>	<i>Maianthemum canadense</i>
<i>Betula lutea</i>	<i>Milium effusum</i>
<i>Botrychium matricariaefolium</i>	<i>Picea rubens</i>
<i>Botrychium oneidense</i>	<i>Polygonum cilinode</i>
<i>Bromus ciliatus</i>	<i>Prunus pensylvanica</i>
<i>Campanula aparinoides</i>	<i>Prunus virginiana</i>
<i>Carex brunnescens</i>	<i>Ribes glandulosum</i>
<i>Carex debilis</i>	<i>Rubus idaeus</i> var. <i>canadensis</i>
<i>Carex trisperma</i>	<i>Sambucus pubens</i>
<i>Chrysoplenium americanum</i>	<i>Scirpus cespitosus</i> var. <i>callosus</i>
<i>Clintonia borealis</i>	<i>Sorbus americana</i>
<i>Coeloglossum viride</i> var. <i>virescens</i>	<i>Streptopus roseus</i>
<i>Corylus cornuta</i>	<i>Streptopus amplexifolius</i>
<i>Dryopteris campyloptera</i>	<i>Thelypteris phegopteris</i>
<i>Gentiana linearis</i>	<i>Thelypteris simulata</i>
<i>Goodyera repens</i> var. <i>ophioglossoides</i>	<i>Trillium undulatum</i>
<i>Heracleum maximum</i>	<i>Veratrum viride</i>
<i>Hieracium scabrum</i>	<i>Vaccinium angustifolium</i>
<i>Hydrophyllum virginianum</i>	<i>Viburnum alnifolium</i>
var. <i>atranthum</i>	<i>Viburnum cassinoides</i>
<i>Lilium canadense</i>	

elevations, large Tsuga canadensis individuals are frequent; on similar sites after logging, Liriodendron tulipifera forms a uniform canopy with Tsuga saplings in the understory. Prunus pensylvanica is a disturbance-tree at mid- to high elevations; it is scarce on undisturbed sites.

Less familiar than the variation described above is the east-west floristic gradient in the park. This has an elevational component--the lowest elevations in western GRSM are 850 ft (260 m), whereas the lowest elevations in the eastern park of the park are ca 1,700 ft (520 m). Another factor is the presence of four limestone windows (Cades Cove, White Oak Sink, Rich Mountain Gap, and Big Spring Cove) in western GRSM and the close proximity of the Ridge and Valley Physiographic Province to that part of the park. There may also be an historical explanation for some east-west patterns (see Whittaker's (1956) theory for the abrupt western boundary of spruce-fir forest in GRSM). Examples of this east-west floristic gradient are striking: Trillium catesbaei is relatively frequent in western GRSM, from low to mid-elevations, but is absent at similar elevations eastward. Cymophyllus fraseri, on the other hand, is frequent in the central and eastern Great Smoky Mountains but scarce westward in the park.

Perhaps the most distinctive of the local floras in GRSM is that of western GRSM (Fig. 1). Spruce-fir vegetation is absent from the higher ridges; piedmont, mid-western limestone, and even a few coastal plain species are found at lower elevations. Plants representative of this western GRSM distribution were divided into several subcategories (Table 7): general, Lower Abrams Creek, coastal plain affinities, limestone windows, and wetlands. Representative plants of an eastern and southern distribution within the park are listed in Table 8. Table 8 also lists the rare plants of the higher elevations of the central part of the park. These lists give an idea of the

Table 7. Representative species of special habitats and distributions in western GRSM. Species are not necessarily restricted to the categories in which they are listed.

WESTERN GRSM

General:

Trillium catesbaei
Vaccinium hirsutum

Lower Abrams Creek:

Ampelopsis cordata
Aster oblongifolius
Callicarpa americana
Celtis tenuifolia
Chionanthus virginicus
Cocculus carolinianus
Desmodium paucifolium
Eupatorium sessilifolium
Hexastylis shuttleworthii
Hydrangea radiata
Ilex beadlei
Itea virginica
Magnolia macrophylla
Menispermum canadense
Polygala paucifolia
Prenanthes serpentaria
Salix caroliniana
Schrunkia microphylla
Silene rotundifolia
Silphium compositum
Solidago sphacelata
Smilax bona-nox
Spiraea virginiana
Trillium cuneatum
Vaccinium arboreum

Coastal Plain Affinities:

Acer rubrum var. trilobum
Crotalaria purshii
Helianthus angustifolius
Ranunculus laxicaulis
Sabatia companulata
Viola lanceolata
Woodwardia virginica

Limestone Windows:

Asplenium resiliens
Asplenium ruta-muraria
Carex eburnea
Carex jamesii
Calestrus scandens
Corallorhiza wisteriana
Crataegus calpodendron

Cystopteris bulbifera
Decumaria barbara
Delphinium tricornis
Dentaria multifida
Disporum lanuginosum
Dodacatheon maedia
Eryngium yuccifolium
Hydrophyllum macrophyllum
Hybanthus concolor
Mertensia virginica
Pellaea atropurpurea
Polymnia canadensis
Quercus muhlenbergii
Smilax hugeri
Solidago caesia
Spigelia marilandica
Staphylea trifoliata
Swertia caroliniensis
Viburnum rufidulum
Vitis cinerea

Wetlands:

Bidens cerna
Calamagrostis cinnoides
Callitriche deflexa
Campanula aparinoides
Carex lupulina
Carex frankii
Cephalanthus occidentalis
Dulichium arundinaceum
Erianthus giganteus
Fimbristylis autumnalis
Gratiola neglecta
Gratiola virginica
Lindernia dubia
Ludwigia decurrens
Ludwigia palustris
Penthorum sedoides
Scirpus atrovirens
Sparganium americanum
Thelypteris palustris
Typha latifolia
Uniola laxa
Viola lanceolata
Woodwardia virginica
Xyris torta

Table 8. Representative species more common in or restricted to eastern GRSM, southern GRSM, and higher elevations in the Clingmans Dome-Mount LeConte-Charlies Bunion area.

EASTERN GRSM

Amiantheum muscaetoxicum
Coeloglossum viride var. *virescens*
Convallaria montana
Cymophyllus fraseri
Dryopteris celsa
Euphorbia purpurea
Goodyera repens
Helianthus glaucophyllus
Maianthemum canadense
Silene ovata
Rhododendron roseum
Veronicastrum virginicum

NC SIDE OF THE PARK ONLY

Agastache scrophulariaefolia
Astragalus canadensis
Castanea pumila
Castilleja coccinea
Corydalis sempervirens
Gentiana quinquefolia
Heuchera longiflora
Hydrocotyle americana
Ilex collina
Lilium philadelphicum
Phacelia dubia
Symplocos tinctoria
Tradescantia ohimensis

SCARCE PLANTS OF THE HIGH CENTRAL
 GREAT SMOKY MOUNTAINS

Betula cordifolia
Bromus ciliatus
Calamagrostis cainii
Drosera rotundifolia
Gentiana linearis
Geum radiatum
Glyceria nubigena
Ilex collina
Juncus trifidus var. *monanthos*
Krigia montana
Lycopodium selago
Milium effusum
Parnassia asarifolia
Rubus idaeus var. *canadensis*
Scirpus cespitosus var. *callosus*
Streptopus amplexifolius var. *americana*
Thelypteris phegopteris
Thelypteris simulata

special floristic areas in the park. The checklist includes descriptions of habitat and geographic range in GRSM for all taxa.

The Southern Appalachians are famous for their endemics (Harper 1947, 1948). Eighty-six species (6 percent of the total) in the GRSM flora are southern mountain endemics (Table 9). Three species are strictly endemic to GRSM: Calamagrostis cainii (Mount LeConte), Glyceria nubigena (central high ridge), and Cacalia rugelia (spruce-fir zone throughout the park). Previous reports of Glyceria nubigena from outside the park (Cooper et al. 1977) now seem to be in error (Jim Massey, personal communication). Several additional species are endemic to the southwestern part of the Southern Appalachians near GRSM, although they are found both inside and outside the park: Helianthus glaucophyllus, Gaylussacia ursina, and Vaccinium hirsutum.

Regional Diversity

The Chilhowee Mountain flora (Thomas 1976) includes 86 species not yet known from GRSM (Appendix III). An additional 149 species were found in the parts of the five counties that lie beyond the park (Appendix IV). This brings the total of vascular plants of the five-county area to 1,673 species. Among the phytogeographically important plants of the Chilhowee flora, unknown in GRSM, are Acer saccharinum, Aesculus glabra, Aristida spp., Ptelea trifoliata, Saururus cernuus, Sicyos angulatus, Silphium terebinthinaceum, Urtica procera, and Xerophyllum asphodeloides. Among the important plants of the five-county area are Angelica atropurpurea, Berberis canadensis, Buckleya distichophylla, Calamagrostis canadensis, Carya carolinae-septentrionalis, Comptonia peregrina, Corallorhiza maculata, Deschampsia flexuosa, Diervilla lonicera, Dirca palustris, Eriophorum virginicum, Fothergilla major, Hypericum buckleyi, Lonicera dioica, Pachysandra,

Table 9. Southern Appalachian endemics in the GRSM flora (from Fernald 1950; Harper 1947, 1948; Radford et al. 1968). Species found (though rarely) also in areas peripheral to the mountains--southern Pennsylvania, the Cumberland Plateau, the Piedmont, and/or northeast Alabama--are indicated by an asterisk (*).

<i>Abies fraseri</i>	<i>Listera smallii</i>
* <i>Anemone lancifolia</i>	<i>Lysimachia fraseri</i>
<i>Angelica triquinata</i>	* <i>Magnolia fraseri</i>
<i>Aster curtisii</i>	<i>Menziesia pilosa</i>
* <i>Astilbe biternata</i>	<i>Monotropsis lehmaniae</i>
* <i>Boykinia aconitifolia</i>	* <i>Parnassia asarifolia</i>
<i>Cacalia rugelia</i>	<i>Penstemon smallii</i>
<i>Calamagrostis cainii</i>	* <i>Phacelia fimbriata</i>
* <i>Campanula divaricata</i>	* <i>Philadelphus hirsutus</i>
<i>Cardamine clematitis</i>	* <i>Phlox stolonifera</i>
* <i>Cardamine flagelifera</i>	<i>Pieris floribunda</i>
<i>Carex austro-carolinianae</i>	* <i>Pinus pungens</i>
<i>Carex biltomoreana</i>	<i>Prenanthes roanensis</i>
<i>Carex misera</i>	<i>Pycnanthemum montanum</i>
<i>Carex purpurifera</i>	<i>Pyrularia pubera</i>
<i>Carex ruthii</i>	* <i>Rhododendron arborescens</i>
<i>Chelone lyonii</i>	<i>Rhododendron bakeri</i>
* <i>Cimicifuga americana</i>	* <i>Rhododendron calendulaceum</i>
* <i>Clethra acuminata</i>	<i>Rhododendron catawbiense</i>
* <i>Convallaria montana</i>	<i>Ribes rotundifolium</i>
* <i>Cymophyllus fraseri</i>	<i>Robinia boyntonii</i>
<i>Dicentra eximia</i>	<i>Robinia kelseyi</i>
<i>Diervilla sessilifolia</i>	<i>Saxifraga careyana</i>
<i>Diphyllera cymosa</i>	<i>Saxifraga michauxii</i>
<i>Draba ramosissima</i>	<i>Saxifraga micranthidifolia</i>
* <i>Galax aphylla</i>	<i>Solidago curtisii</i>
* <i>Galium latifolium</i>	<i>Solidago glomerata</i>
<i>Gaylussacia ursina</i>	<i>Solidago roanensis</i>
* <i>Gentiana decora</i>	<i>Spiraea virginiana</i>
<i>Geum radiatum</i>	<i>Stachys clingmanii</i>
<i>Glyceria nubigena</i>	<i>Stachys latidens</i>
<i>Helianthus glaucophyllus</i>	<i>Stachys riddellii</i>
* <i>Hexastylis arifolia</i>	<i>Stellaria corei</i>
* <i>Houstonia serpyllifolia</i>	* <i>Stewartia ovata</i>
* <i>Hydrangea radiata</i>	* <i>Thalictrum clavatum</i>
<i>Hypericum graveolens</i>	<i>Thaspium pinnatifidum</i>
<i>Hypericum mitchellianum</i>	* <i>Thermopsis mollis</i>
<i>Ilex beadlei</i>	<i>Trillium vaseyi</i>
<i>Ilex collina</i>	<i>Uvularia pudica</i>
<i>Juncus trifidus</i> var. <i>monanthos</i>	<i>Vaccinium erythrocarpon</i>
<i>Krigia montana</i>	<i>Vaccinium hirsutum</i>
<i>Leucothoe recurva</i>	* <i>Vaccinium pallidum</i>
<i>Lilium grayii</i>	<i>Veratrum parviflorum</i>

procumbens, Pedicularis lanceolata, Populus grandidentata, Potentilla tridentata, Trillium pusillum, Tsuga caroliniana, and Vaccinium macrocarpon.

Thomas (1976) stated that 30 percent of the Chilhowee Mountain flora of 953 species did not occur in GRSM. Recent collecting in the Lower Abrams Creek-Hesse Creek area (which lies near Chilhowee Mountain) has reduced this total to 9 percent (86 species). Further collecting in this area may reduce the total further; western GRSM is geographically and floristically a transition to Thomas' study area. It includes the lowest elevations in the park (850 ft; 260 m). Chilhowee Mountain lies between the Great Smoky Mountains and the Ridge Valley Physiographic Province, and hence the area includes a number of phytogeographically interesting species. As noted elsewhere, western GRSM has a number of floristic differences when compared to the high mountains of the central portion of the park.

Threats to the Flora: A Brief Synopsis

Despite legal protection from development, several kinds of threats persist in GRSM or permeate the park from outside its borders (White and Bratton 1980, Bratton and White 1980). This report does not intend to present a thorough assessment of these threats nor a review of the accumulating research that has addressed them. Threats specific to GRSM's rare plants will be evaluated in subsequent reports. However, several of these threats warrant mention here because they have altered and are altering plant distributions in the park. An outline of threats is presented in Table 10; a few specific examples are given below. In general, extirpation (actual elimination of a species from the park flora) appears to be rare (Table 10), although documentation is difficult due to inadequacies in the past data base. Monitoring of rare plants has begun in the last three years.

Table 10. Threats to the GRSM flora (see also White and Bratton 1980).

Threat	Cause of Possible extirpation
<hr/> Direct human impacts <hr/>	
Illegal gathering (<u>Panax quinquefolium</u> , Orchidaceae)	
Legal gathering (<u>Allium tricoccum</u>)	
Over-collecting for scientific reaseach	X
Park development	X
<u>Ribes</u> eradication for white pine blister rust control	
Bull-dozing of sinkhole pond--Cades Cove	X
Trail erosion	
TVA impoundments	X
Indirect human impacts	
Exotic pests and diseases (Chestnut blight, Dutch elm disease, balsam woolly aphid)	
Exotic animals (European wild boar)	
Exotic plants (See text)	
Large populations of native animals	
Plant succession (Grassy balds, Cades Cove wetlands, after fire exclusion)	X
Air pollution	

Direct human impacts include illegal collecting of ginseng (Panax quinquefolius)--field reconnaissance shows that few GRSM populations have the age structure characteristic of "uncollected" ginseng populations (Robert Sutter, personal communication). Poaching (illegal gathering) of showy flowering plants also occurs. Some cases of overcollecting by researchers have come to my attention: perhaps half the population of Lycopodium selago on Cliff Tops was recently gathered in a single collecting day. Park management activities are responsible for a few direct threats; for example, Ribes eradication for the control of white pine blister rust has been carried out periodically from ca 1940 to 1965 (thousands of bushes removed in some cases). Also, park developments (when sufficient environmental information has not been gathered) are responsible for the loss of some plants (e.g., Hypericum densiflorum from near the Sugarlands Visitor Center).

Other anthropogenic threats to the park flora are more indirect. Exotic animals, pests and diseases, and plants have impacted some native plant communities in GRSM. Widespread change in the spruce-fir zone of the park can be expected based on the continuing infestation of balsam woolly aphid. Exotic plants are also found around some park buildings (e.g., Berberis julianae and B. thunbergii at the Sugarlands Visitor Center), and some have begun to escape to bordering areas. Elkmont and Twin Creeks have, in particular, large collections of exotic species (see Appendix VII).

Visitor impacts like trail erosion threaten a few areas. Most notable of these is Cliff Tops on Mount LeConte, where a large area is already bare of soil. Important rare species are found on this rock formation and it warrants high priority for protection.

Other threats include succession in remnant wetlands and on grassy balds. The present condition of these habitats is the result of past human occupation

of the landscape. The wetlands of Cades Cove are much changed from the original situation and now occupy irregular areas in farm fields. TVA dams have flooded areas in western and southwestern GRSM and may have eliminated a few species; the habitats created may also result in the introduction of new species in the park's flora.

Future Work

The park has long attracted botanists; however, as the additions to the checklist show, there is good potential for further explanation. In particular, the fringes of the park (the Lower Abrams Creek-Hesse Creek area, the four limestone windows (Cades Cove, White Oak Sink, Rich Mountain Gap, and Big Spring Cove), Cataloochee Creek, and the dry and difficult-to-access slopes above the TVA lakes in Swain County) have yielded additions to the checklist or new records for rare plants in the last four years. To these can be added the steep, moist, north-facing rocky slopes between Mount LeConte and Clingmans Dome (which have also yielded many important species) and unusual habitats such as wetlands and cliff faces. The TVA lakes have probably extirpated several plants from the park (e.g., Alisma subcordatum, Symplocos tinctoria); they have also created new habitats (mud flats and slow-moving water), which may prove an avenue for some plants into the park flora. Of course, all collecting must be done under permit in the national park (write to the Park Superintendent, Great Smoky Mountains National Park, Gatlinburg, Tennessee 37738, for information). Certainly, small populations of plants should not be collected to endangerment. Special caution is needed to ensure the preservation of the park's natural resources.

Taxonomic problems also remain in several genera: Carex section Ovales, Crataegus, Panicum, Penstemon, Pycnanthemum, the Ranunculus hispidus complex, Stachys, tall Vaccinium species, and Viola. In all of these groups, existing keys were not entirely satisfactory.

CHECKLIST FORMAT

The families are arranged alphabetically within four groups: (1) Pteridophyta, (2) Gymnospermae, (3) Angiospermae-Monocotyledoneae, and (4) Angiospermae-Dicotyledoneae. Within each family, the genera, species, and infraspecific taxa are arranged alphabetically. After the family name (centered and in capital letters), the family reference number is given: "(Fam. X)." This number is Fernald's (1950) family number (also used in Hoffman 1964). This number also indexes the arrangement of herbarium specimens in the Great Smoky Mountains National Park Herbarium.* After the genus name (centered and with only the first letter capitalized), the generic reference number is given: "(Gen. X)." These Dalla Torre and Harms numbers reference the generic folders at the University of Tennessee Herbarium.

Each species is assigned a common name. In some cases this is simply a translation of a scientific name (e.g., "Swan's sedge" for Carex swanii) or a generic level common name (e.g., "sedge" for several Carex species for which a translation of the specific epithet was not particularly useful).

After the common name, abundance in the park is stated:

Possibly extirpated--has not been rediscovered in the flora since
original collection (20-100 years)

Very rare--a single locale, few individuals

Rare--1 or 2 locales, generally small populations

Scarce--several locales, or scattered small populations

Infrequent--scattered locales throughout

Occasional--well distributed but not anywhere abundant

Frequent--generally encountered

Common--characteristic and dominant

"Common" and "frequent" require additional explanation. Very few species range throughout the park. Plants common and characteristic in one habitat are rare or absent from another. Hence, abundance must be read in the context of habitat.

Habitat descriptions include reference to two main gradients: elevation and the topographic-moisture gradient. The topographic-moisture gradient for wooded sites is given as follows: mesic, or moist but well-drained; submesic; subxeric; xeric, or dry (see Whittaker 1956). South- and west-facing slopes are generally drier, and north- and east-facing slopes are generally moister, all other factors (e.g., elevation) being equal. Convex topography (a ridge) is drier than concave topography (a cove). Habitat descriptions also refer to such special situations as limestone bedrock, wetlands, seepage areas, cliffs, landslide scars, grassy balds, and heath balds. Reference is frequently made to whether the habitat is forested or open and to the influence of natural and human disturbance. Successional state of the characteristic habitat is given where appropriate.

Elevation range is given using the following three categories:

Low elevations - 850-2,500 ft (260-760 m)

Mid-elevations - 2,500-4,500 ft (760-1,370 m)

High elevations - 4,500-6,600 ft (1,370-2,010 m)

In a complex area like GRSM it is difficult to be absolutely precise, even within these broad categories. For example, some plants which are described as ranging to mid-elevations may rarely be found somewhat higher (e.g., 5,000 ft).

After abundance, habitat, and elevation range are given, general geographic distribution in GRSM is stated. Plants found throughout the park, from eastern to western areas and on both the Tennessee and North Carolina

sides of the park, are described as occurring "throughout." More limited distributions are described; for example, as "western GRSM only," "more common on the Tennessee side of the park," and "known only from the North Carolina side of the park." As a further index of geographic range of the plants, county records for restricted plants are cited (see Fig. 1):

Blount County--Tennessee, westernmost GRSM

Cocke County--Tennessee, easternmost GRSM, north side

Sevier County--Tennessee, middle GRSM, north side

Haywood County--North Carolina, easternmost GRSM

Swain County--North Carolina, broad area, south side

For rare or difficult taxa I also cited herbarium specimens (by collector, collection number, herbarium) so that others may evaluate the taxon based on examination of herbarium material. Herbaria are identified by acronyms as follows:

TENN--University of Tennessee

GRSM--Great Smoky Mountains National Park

NCU---University of North Carolina, Chapel Hill

DUKE--Duke University

IBE---Institute for Botanical Exploration, Mississippi State University

Other herbaria are spelled out in full.

Notes on identification and synonymy appear at the end of taxon entries. I supplied synonymy to Hoffman's list and also to the "Vascular flora of the Carolinas" (Radford 1968) (the most recent floristic manual including GRSM). Following usage in Cronquist (1980), I abbreviated references to this flora:

R -- Radford et al. (1968), "Vascular flora of the Carolinas."

"Not in R" means that the binomial does not appear in Radford et al. (1968), either in the species listed or in synonymy.

The main sources of identification were Radford et al. (1968), Fernald (1950), Gleason (1952), Cronquist (1980), and sources in Wofford and White (1981); see Literature Cited. Orchid nomenclature follows Luer (1975). For a few genera it was evident that existing manuals and monographs do not allow complete resolution of our taxa. I had to organize these plants as best as I could with local material. For example, in Craetagus, I lumped much variation within C. crus-galli because the variation was continuous. On the other hand, I split several taxa in this genus based on distinct leaf types (i.e., intermediate individuals were absent). The common upland blue violets--more or less hairy and with lateral petals bearded--form a particularly confusing series from V. cucullata to V. papilionacea to V. soraria (V. septentrionalis and V. affinis were dropped here as well). The tall blueberries, based on GRSM material, cannot be segregated into several taxa at this time.

Records based on my own recent collecting are identified by "PSW". These collections are at GRSM.

Exotic species are indicated by an asterisk (*) before the binomial. Native range is given at the end of the entry ("Native to").

Typical varieties are indicated only if additional infraspecific taxa are present. For example, the typical variety of Trillium erectum appears as, "Trillium erectum var. erectum" because three additional taxa are listed (f. albiflorum, var. blandum, and f. luteum). Typical Trillium undulatum appears only as "Trillium undulatum" since no additional taxa are listed in this species.

AN ANNOTATED CHECKLIST OF THE VASCULAR PLANTS
OF GREAT SMOKY MOUNTAINS NATIONAL PARK

PTERIDOPHYTA

ASPIDIACEAE (Fam. 9A)

Athyrium (Gen. 304)

Athyrium asplenoides (Michx.) A. A. Eaton. Southern lady fern. Common throughout, in mesic woods and thickets. (*A. filix-femina* Roth of Hoffman).

Athyrium pycnocarpon (Spreng.) Tidestr. Narrow-leaved spleenwort.

Occasional in rich, moist woods and coves, low to mid-elevations.

Athyrium thelypteroides (Michx.) Desv. Silvery spleenwort. Frequent in mesic woods, except at the highest elevations.

Cystopteris (Gen. 316)

Cystopteris bulbifera (L.) Bernh. Bulblet fern. Rare, limestone outcrops. Cades Cove and White Oak Sink (Blount Co.).

Cystopteris protrusa (Weatherby) Blasdell. Southern fragile fern. Common throughout in moist rocky woods and streamsides. (*C. diaphana* x *protrusa* of Hoffman is better retained in this taxon.)

Dryopteris (Gen. 369)

Dryopteris campyloptera Clarkson. Mountain woodfern. Common at upper elevations in northern hardwoods and spruce-fir. This plant is usually larger than *D. intermedia*, is deciduous (*D. intermedia* is evergreen), and has the innermost pinnules on the lowest pinnae longer than the adjacent ones (usually shorter in *D. intermedia*). (*D. spinulosa* var. *americana* (Fisch.) Fern. of Hoffman).

Dryopteris celsa (W. Palmer) Small. Log fern. Rare, known only from one population near Walnut Bottoms (Haywood Co.), where it was discovered by M. E. Evans in 1977.

Dryopteris goldiana (Hook.) Gray. Goldie's fern. Scarce, in moist, rocky coves, at mid-elevations.

Dryopteris intermedia (Willd.) Gray. Intermediate woodfern. Common throughout in a variety of habitats. See *D. campyloptera* for distinguishing features. (*D. spinulosa* var. *intermedia* Under. of Hoffman; no specimens of *D. spinulosa* nor of *D. spinulosa* var. *fruticosa* (Gilbert) Tridell have been collected in GRSM, although Hoffman cited the latter.)

Dryopteris marginalis (L.) Gray. Marginal woodfern. Frequent in rocky woods, lower to mid-elevations. (*Dryopteris marginalis* f. *elegans* (J. Robins.) F. W. Gray was cited by Hoffman but because of intergradations with *D. marginalis*, this taxon is not retained here.)

Onoclea (Gen. 302)

Onoclea sensibilis L. Sensitive fern. Occasional in moist ground at lower elevations (seeps, swamps, roadside ditches).

ASPIDIACEAE (Cont.)

Polystichum (Gen. 356)

Polystichum acrostichoides (Michx.) Schott. Christmas fern. Common throughout in rocky woods but less common at the highest elevations.

Thelypteris (Gen. 260)

Thelypteris hexagonoptera (Michx.) Weatherby. Broad beech fern. Common throughout in moist to dry woods, but less common at the highest elevations.

Thelypteris noveboracensis (L.) Niewl. New York fern. Common throughout in a variety of shaded and open habitats.

Thelypteris palustris Schott. Marsh fern. Rare, known only from one population in a wooded swamp near Abrams Creek in Cades Cove (Blount Co.) (PSW).

Thelypteris phegopteris (L.) Slosson. Northern beech fern. Rare, scattered populations in spruce-fir on the steep north face of Mount LeConte and Clingmans Dome (Sevier Co.); also near Webb Overlook (Swain Co.).

Thelypteris simulata Niewland. Massachusetts fern. Rare and perhaps extirpated; boggy woods near Newfound Gap (Sevier Co.). The only Tennessee record; this station is 600 km south of the nearest other populations. Reported by Moran (1981) based on a 1931 H. S. Pepoon collection at the Illinois Natural History Survey Museum.

Woodsia (Gen. 319)

Woodsia obtusa (Spreng.) Torr. Blunt-lobed woodsia. Scarce, rocky woods and thickets at lower elevations (Blount, Sevier, Swain Cos.)

ASPLENIACEAE (Fam. 9B)

Asplenium (Gen. 288)

Asplenium montanum Willd. Mountain spleenwort. Frequent throughout on non-calcareous shaded ledges.

Asplenium platyneuron (L.) Oakes. Ebony spleenwort. Frequent in woods and thickets, low to mid-elevations.

Asplenium resiliens Kunze. Black-stemmed spleenwort. Rare, on shaded limestone ledges. (Blount Co.). An odd locale for this plant was brought to my attention by Don DeFoe--it is growing on a stone bridge near Sugarlands (Sevier Co.).

Asplenium ruta-muraria L. Wall-rue. Rare, on limestone ledges. White Oak Sink (Blount Co.) (PSW).

Asplenium trichomanes L. Maidenhair spleenwort. Occasional throughout on shaded ledges.

ASPLENIACEAE (Cont.)

Camptosorus (Gen. 288)

Camptosorus rhizophyllus (L.) Link. Walking fern. Scattered populations, on rocks and ledges in moist woods. On limestone in western GRSM but found on a variety of rocks elsewhere. Low to mid-elevations.

BLECHNACEAE (Fam. 9C)

Woodwardia (Gen. 404)

Woodwardia aerolata (L.) Moore. Net-leaved chain fern. Frequent on wet ground and limestone sinkholes, western GRSM (Blount Co.).

Woodwardia virginica (L.) Smith. Virginia chain fern. Rare, known from a single sinkhole pond, Cades Cove (Blount Co.). Among several plants of western GRSM which show an interesting coastal plain affinity. (Wofford et al. 1977).

EQUISETACEAE (Fam. 1)

Equisetum (Gen. 011)

Equisetum arvense L. Field horsetail. Rare, streamsides and thickets (Haywood and Swain Cos.).

HYMENOPHYLLACEAE (Fam. 8)

Trichomanes (Gen. 117)

Trichomanes petersii Gray. Peters' filmy fern. Rare, shaded and moist rock crevices, Tremont area (Blount and Sevier Cos.). Small, easily overlooked and often mistaken for a bryophyte. *Trichomanes boschianum* Sturm. has been found on the banks of Calderwood Lake near GRSM, but there are no known populations within our boundaries.

ISOETACEAE (Fam. 4)

Isoetes (Gen. 009)

Isoetes engelmannii A. Br. Quillwort. Rare, ponds and water courses. Cades Cove and Cataloochee (Blount and Haywood Cos.). *Isoetes engelmannii* var. *caroliniana* A. A. Eaton, with irregularly reticulate spores, was recognized by Hoffman; however, the taxonomy of this group needs further work--I follow Radford et al. (1968) in not recognizing subspecific taxa at this time.

LYCOPODIACEAE (Fam. 2)

Lycopodium (Gen. 003)

- Lycopodium annotinum* L. Stiff clubmoss. Rare and perhaps extirpated. Known in GRSM and Tennessee only from two Albert Ruth collections (from 1890, 1899) on Thunderhead Mt. (Blount Co.). Some botanists doubt the validity of this record, since the plant has not been seen since, and Ruth was known for poor label data. The two collections (at TENN) bear the following data: (1) Summit of Thunderhead Mt, 6708 ft, 7/29/1890; (2) Summit of Thunderhead Mt, 6000 ft, 7/29/1899. The collections are from the same calendar date, but 9 years apart; in addition, Thunderhead Mt. reaches only 5,527 ft (however, maps in Ruth's day were less accurate). (Not in R).
- Lycopodium clavatum* L. Staghorn clubmoss. Occasional in mesic to dry woods, roadbanks, thickets, mid- to upper elevations.
- Lycopodium flabelliforme* (Fernald) Blanchard. Ground pine. Occasional throughout in dryish woods, roadbanks, thickets. (*L. complanatum* var. *flabelliforme* Fern. of Hoffman's list).
- Lycopodium lucidulum* Michx. Shining clubmoss. Common throughout in moist woods.
- Lycopodium obscurum* var. *isophyllum* Hickey. Tree clubmoss. Occasional in dryish woods. Leaves all the same size. (Not in R).
- Lycopodium obscurum* L. var. *obscurum*. Tree clubmoss. Occasional in dryish woods. Leaves 4-ranked, of two sizes. *Lycopodium obscurum* var. *dendroideum* (Michx.) D. C. Eaton, with leaves 6-ranked, has not yet been collected from GRSM but is to be looked for.
- Lycopodium porophyllum* Lloyd & Underw. Rock clubmoss. Rare, on moist ledges, known only from one locale in the Greenbrier area (Sevier Co.).
- Lycopodium selago* L. Alpine clubmoss. Rare, moist, usually shaded rocks and cliff faces, Mount LeConte and Clingmans Dome (Sevier Co.). Two varieties have been recognized:
Lycopodium selago var. *appressum* Desv., with closely appressed leaves, and
Lycopodium selago var. *patens* Desv., with spreading leaves.
 Both types occur in GRSM.
- Lycopodium tristachyum* Pursh. Ground cedar. Occasional, dryish woods, heath balds, roadbanks.

OPHIOGLOSSACEAE (Fam. 5)

Botrychium (Gen. 012)

- Botrychium biternatum* (Sav.) Underw. Sparse-lobed grape fern. Woods at low to mid-elevations. See *B. dissectum* below. (*B. dissectum* var. *tenuifolium* (Underw.) Farw.; *B. tenuifolium* Underw.).
- Botrychium dissectum* Spreng. Cut-leaved grape fern. Frequent, woods and thickets, except at highest elevations. The *B. dissectum* complex is a difficult one and there has been much disagreement on the identity and validity of the taxa (including in GRSM, *B. biternatum*, *B. dissectum* f. *obliquum*, and *B. oneidense*).
- Botrychium dissectum* f. *obliquum* (Muhl.) Fern. Coarse-lobed grape fern. Frequent, woods and thickets, except at highest elevations. Seemingly distinct from *B. dissectum* in GRSM, but two taxa intergrade in some parts of their range. (Not in R).

OPHIOGLOSSACEAE (Cont.)

- Botrychium matricariaefolium* A. Br. Daisy-leaf grape fern. Rare--two populations documented in herbaria, both in woods at mid-elevations and both state records (Sevier and Swain Cos.; O'Dell 1961, Pittillo et al. 1975). (Not in R). Disjunct from West Virginia.
- Botrychium oneidense* (Gilbert) House. Blunt-lobed grape fern. Apparently rare, but possibly confused with other taxa in the *B. dissectum* group. Three populations documented by Dan Pittillo (Western Carolina University herbarium) and one older collection (Smithsonian herbarium). (Sevier and Swain Cos.)
- Botrychium virginianum* (L.) Sw. Rattlesnake fern. Common throughout in moist woods.

Ophioglossum (Gen. 016)

- Ophioglossum vulgatum* var. *pynostichum* Fern. Adder's tongue fern. Scarce, but throughout at lower elevations along streams, in thickets and old fields (Blount, Cocke, Sevier Cos.).

OSMUNDACEAE (Fam. 6)

Osmunda (Gen. 26)

- Osmunda cinnamomea* L. Cinnamon fern. Frequent throughout in wet ground, dry woods.
- Osmunda claytoniana* L. Interrupted fern. Occasional throughout, usually in upper elevation oak stands.
- Osmunda regalis* var. *spectabilis* (Willd.) Gray. Royal fern. Occasional, low ground, streamsides, woods.

POLYPODIACEAE (Fam. 9E)

Polypodium (Gen. 206)

- Polypodium polypodioides* (L.) Watt. Southern polypody, resurrection fern. Infrequent at lower elevations, on rocks and tree trunks.
- Polypodium virginianum* L. Common polypody. Frequent throughout on shaded rocks.

PTERIDACEAE (Fam. 9D)

Adiantum (Gen. 086)

- Adiantum pedatum* L. Maidenhair fern. Frequent in rich, moist woods.

Cheilanthes (Gen. 047)

- Cheilanthes lanosa* (Michx.) D. C. Eaton. Hairy lipfern. Rare, steep, rocky, dry slopes at lower elevations. *Cheilanthes alabamensis* Kunze has been found just outside GRSM in Blount Co.

PTERIDACEAE (Cont.)

Cheilanthes tomentosa Link. Woolly lipfern. Rare, steep, rocky, dry slopes at lower elevations. (*C. vestita* (Spreng.) Sw. of Hoffman's list).

Dennstaedtia (Gen. 238)

Dennstaedtia punctilobula (Michx.) Moore. Hayscented fern. Frequent throughout, usually in disturbed areas in woods, more important at higher elevations.

Pellaea (Gen. 057)

Pellaea atropurpurea (L.) Link. Purple-stemmed cliffbrake. Rare, on limestone outcrops, western GRSM (Blount Co.)

Pteridium (Gen. 244)

Pteridium aquilinum var. *latiusculum* (Desv.) Underw. Bracken fern. Frequent, throughout in dry woods, roadbanks, thickets. Leaves sparsely pubescent beneath, pinnule tip ca 4 times longer than broad. (Included in *P. aquilinum* (L.) Kuhn. in R).

Pteridium aquilinum var. *pseudocaudatum* (Clute) Heller. Bracken fern. First collected in GRSM by J. Dan Pittillo (Swain Co., specimen at Western Carolina University.) Leaves glabrous beneath, pinnule ca 8 times longer than broad. (Included in *P. aquilinum* (L.) Kuhn. in R).

Vittaria (Gen. 093)

Vittaria sp. Rare, moist rock crevices. A tropical fern, known in the Southern Appalachians only as a gametophyte (Wagner and Sharp 1963). (Not in R).

SCHIZAEACEAE (Fam. 7)

Lygodium (Gen. 034)

Lygodium palmatum (Bernh.) Sw. Hartford climbing fern. Scattered populations at lower and mid-elevations in a variety of habitats, from seepage areas and wet cliffs to dry roadbanks and trailsides.

SELAGINELLACEAE (Fam. 3)

Selaginella (Gen. 008)

Selaginella apoda (L.) Spring. Meadow spike-moss. Scarce and easily overlooked, marshy ground, streamsides.

SPERMATOPHYTA

GYMNOSPERMAE

CUPRESSACEAE (Fam. 13B)

Juniperus (Gen. 45)

Juniperus virginiana L. Red cedar. Occasional at lower elevations in old fields and dry rocky woods.

Thuja (Gen. 42)

**Thuja occidentalis* L. Northern white cedar. Rare, persistent at old homesites after cultivation. Native in the Cumberlands and NE Tennessee (at its southern range limit).

**Thuja orientales* L. Oriental white cedar. Rare, persistent at old homesites after cultivation. Introduced from E. Asia.

PINACEAE (Fam. 13A)

Abies (Gen. 29)

Abies fraseri (Pursh) Poir. Fraser fir. Common at higher elevations but ranging west only to the Silers Bald area.

Picea (Gen. 26)

**Picea abies* (L.) Karst. Norway spruce. Planted at higher elevations after logging (Kephart Prong watershed, Thomas Ridge) and in a few old homesites at low elevations. Introduced from Europe.

Picea rubens Sarg. Red spruce. Common at higher elevations but ranging west only to the Silers Bald-Miry Ridge area. Occasionally planted, low elevations.

Pinus (Gen. 22)

Pinus echinata Mill. Short-leaf pine. Occasional, dry woods and old fields, lower to mid-elevations.

**Pinus palustris* Mill. Rare, persistent after cultivation along Noland Creek (Stupka 1964). Native in the SE U.S. on Piedmont, coastal plain, and interior low plateaus, not in the mountains.

Pinus pungens Lamb. Table Mountain pine. Common, dry woods, mid-elevations.

Pinus rigida Mill. Pitch pine. Common, dry woods and old fields, low to mid-elevations.

Pinus strobus L. White pine. Frequent, dry slopes, gorges, streamsides, low to mid-elevations.

Pinus virginiana Mill. Virginia or scrub pine. Common, dry slopes and old fields, low to mid-elevations.

PINACEAE (Cont.)

Tsuga (Gen. 27)

Tsuga canadensis (L.) Carr. Eastern hemlock. Common, mesic to submesic woods, especially in stream gorges and on steep slopes. *Tsuga caroliniana* Engelm. has not been found in GRSM, although it has been planted in Gatlinburg. The Cataloochee area seems the most likely area to look for native populations.

ANGIOSPERMAE

MONOCOTYLEDONEAE

ALISMATACEAE (Fam. 19)

Alisma (Gen. 70)

Alisma subcordatum Raf. Water-plantain. Rare, shallow water, low elevations. Only one locale in GRSM, near the mouth of Panther Creek (Blount Co.).

Sagittaria (Gen. 78)

Sagittaria latifolia var. *pubescens* (Muhl.) J. G. Smith. Broad-leaved arrowhead. Scarce, wet, open ground, low elevations (Blount, Swain Cos.).

AMARYLLIDACEAE (Fam. 35)

Hypoxis (Gen. 1230)

Hypoxis hirsuta (L.) Coville. Yellow star grass. Common, dry woods, low to mid-elevations, throughout.

Narcissus (Gen. 1201)

**Narcissus pseudo-narcissus* L. Daffodil. Occasional, persistent after cultivation on old homesites, low elevations. Native to Europe.

ARACEAE (Fam. 24)

Acorus (Gen. 694)

**Acorus calamus* L. Sweet-flag. Scarce, marshes, especially near old homesites, pastures. Cades Cove, Greenbrier, Sugarlands. Probably introduced in the park, but native in the vicinity.

Arisaema (Gen. 786)

Arisaema dracontium (L.) Schott. Green dragon. Rare, moist woods, thickets, low elevations. The only collection is from White Oak Sink (Blount Co.); there are reports from Noland Creek (Swain Co.) but no collection has been made.

ARACEAE (Cont.)

Arisaema triphyllum (L.) Schott. Jack-in-the-pulpit. Common, moist woods, low to high elevations, throughout. Very variable--some of the forms have been segregated as species (*A. pusillum* (Peck.) Nash; *A. quinatum* (Nutt.) Schott.).

Peltandra (Gen. 747)

Peltandra virginica (L.) Kunth. Arrow arum. Rare, riverside marsh, low elevations. Only collected once in the park, along the Little Tennessee River (Blount Co.). The site may have been flooded by a TVA dam.

COMMELINACEAE (Fam. 29)

Aneleima (Gen. 899)

**Aneleima keisak* Hasskarl *Aneleima*. Rare, wet, open ground, low elevations. Known only from the shore of Houston Chambers Pond, Cades Cove (Blount Co.) (PSW). A recent arrival in Tennessee and apparently spreading (White 1982). Native to E. Asia (*Murdannia keisak* (Hassk.) Hand. - Mazz.).

Commelina (Gen. 896)

**Commelina communis* L. Common dayflower. Occasional, fields, roadsides, low elevations, throughout. (Including *Commelina communis* var. *ludens* (Miquel) C. B. Clarke).

Commelina diffusa Burm. f. Dayflower. Occasional, fields, low elevations. Collected from Cades Cove (Blount Co.).

Commelina virginica L. Virginia dayflower. Scarce, streamside thicket, low elevation. Collected near Abrams Falls (Blount Co.).

Tradescantia (Gen. 911)

Tradescantia ohiensis Raf. Ohio spiderwort. Scarce, known only from the North Carolina side of the park (Noland Creek, Swain Co.), moist riverside thicket, low elevation.

Tradescantia subaspera Ker. var. *subspersa*. The typical variety is apparently rarer than var. *montana*. One collection: Swain Co.

Tradescantia subaspera var. *montana* (Shuttlew.) Anders & Woodson. Mountain spiderwort. Submesic woods and thickets, low to mid-elevations, throughout. (Included in *T. subaspera* Ker. in R).

CYPERACEAE (Fam. 23)

Bulbostylis (Gen. 471A)

Bulbostylis capillaris (L.) C. B. Clarke. *Bulbostylis*. Scarce, but also easily overlooked, disturbed places, fields, roadsides. Collected from three sites (Blount and Sevier Cos.).

Carex (Gen. 525)

Carex aestivalis M. A. Curtis. Summer sedge. Frequent, mesic open woods, balds, mid- to upper elevations, throughout.

Carex albolutescens Schweinitz. Light-colored sedge. Apparently rare, moist thickets, low elevations. Western GRSM (Blount Co.). In Section Ovales, a group much in need of revision.

CYPERACEAE (Cont.)

- Carex albursina* Sheld. Sedge. Apparently rare, known from a single collection: near Cosby, Cocke County (Bryson 1995 at IBE).
- Carex amphibola* var. *rigida* (Bailey) Fern. Rigid sedge. A single collection, near Elkmont, 2,500 ft, in Sevier County (DeSelm, unnumbered, 1962, TENN). (Not in R).
- Carex amphibola* var. *turgida* Fern. Turgid sedge. A single collection, near Gatlinburg, Sevier County (Rogers 30417, TENN). (Not in R). (Hoffman 1966b).
- Carex annectens* Bicknell. Sedge. Rare, wet meadow, low elevation. Cades Cove only (Blount Co.--specimen at TENN).
- Carex artitecta* Mackenz. Sedge. Occasional, woods, mid- to high elevations, probably throughout.
- Carex austro-caroliniana* Bailey. South Carolina sedge. Occasional, moist thickets, low elevations. Collected from Blount and Sevier Counties.
- Carex baileyi* Brit. Bailey's sedge. Rare, wet ground, low elevations. Collected from Swain County only.
- Carex biltmoreana* Mackenzie. Biltmore sedge. Rare, mesic woods, high elevations. One collection: along Boulevard Trail, Sevier County (P. S. White 2040 at GRSM). C. T. Bryson (personal communication) determined this material but suggested better material is needed to confirm the presence of this rare sedge in the park. (PSW).
- Carex blanda* Dew. Sedge. Occasional, moist woods and thickets, low to mid-elevations, probably throughout but collected from Blount and Sevier Counties.
- Carex bromoides* Schkuhr. Sedge. Frequent, marshy ground, low to high elevations, throughout.
- Carex brunnescens* var. *sphaerostachya* (Tuckerm.) Kunkenth. Few-flowered sedge. Common, moist woods, high elevations, throughout (the variety not in R).
- Carex caroliniana* Schweinitz. Carolina sedge. Rare, wet meadows, low elevations. Cades Cove (Blount Co.; White 1926 at GRSM). (PSW).
- Carex cephalophora* Muhl. ex Schkuhr. Sedge. Scarce, rich woods, low elevations. (Blount and Sevier Cos.). (Hoffman 1966b).
- Carex cherokeensis* Schwein. Cherokee sedge. Occasional, streamsides and roadsides, low elevations. Collected from Blount and Sevier Counties.
- Carex communis* L. H. Bailey. Common sedge. Common, moist woods, mid- to high elevations, throughout. Herbarium material is not always separable from *C. pensylvanica* Lam.
- Carex convoluta* Mackenz. Sedge. Scarce or overlooked (similar to *C. rosea* Schkuhr); the collections are from woods, low elevations, Sevier County. (Included in *C. rosea* Schkuhr in R).
- Carex corrugata* Fern. Wrinkled sedge. Rare, wet meadow, low elevation. Known from a single collection from Cades Cove, Blount County (Sharp et al. 2634, TENN). (*C. grisea* Wahlenburg in R).
- Carex crinita* Lam. var. *crinita*. Drooping sedge. Frequent, marshes, streamside thickets, seeps, trailside ditches, low to high elevations, throughout. (Including *Carex crinata* var. *brevicrinis* Fern. of Hoffman 1966b).
- Carex crinita* var. *gynandra* (Schwein.) Schwein. & Torr. Drooping sedge. Frequent, marshes, seeps. The collections are from high elevations.

CYPERACEAE (Cont.)

- Carex cristatella* Britt. Sedge. Apparently rare, known from a single collection: ridge, south of Clingmans Dome, Swain County (Blomquist and Billings 9642 at DUKE). In Section Ovales, a group much in need of monographic review.
- Carex debilis* Michx. var. *debilis*. Necklace sedge. The common taxon is var. rudgei (pistillate scales keeled). The typical variety (pistillate scales rounded) is present in the collections, from the same habitat and range as var. rudgei; further work is needed to resolve their relationship.
- Carex debilis* var. *interjecta* Bailey. Necklace sedge. Two collections from Pinnacle Mt., Sevier County (Sharp 1282, 1285, at TENN). The mid-ribs of the pistillate scales are excurrent. (Not in R).
- Carex debilis* var. *pubera* Gray. Hairy necklace sedge. A single collection of this variety: Fish Camp Prong, 2,500 ft, Sevier County (Jennison 357, at GRSM). The perigynia are puberulent.
- Carex debilis* var. *rudgei* Bailey. Necklace sedge. Common, moist woods, balds, trailsides, mid- to high elevations, throughout.
- Carex digitalis* Willd. Sedge. Frequent, mesic woods openings, low to mid-elevations, throughout. (Including *Carex digitalis* var. macropoda Fern.).
- Carex eburnea* Boott. Black-fruited sedge. Rare, limestone cliff, low elevations. White Oak Sink (Blount Co.) only.
- Carex emmonsii* Dew. Sedge. Occasional, mesic to submesic woods, mid- to high elevations, probably throughout but collected from Blount and Sevier Counties. Some collections are scarcely separable from *C. pennsylvanica* Lam. or *C. artitecta* Mackenz.
- Carex frankii* Kunth. Frank's sedge. Occasional, wet meadows, seeps, alluvial swamps, low to mid-elevations. Collected from Blount and Sevier Counties.
- Carex gracillima* Schweinitz. Graceful sedge. Apparently rare, currently known from a single collection: Spruce Mt., Haywood-Swain County line (Ramseur 3265 at NCU).
- Carex grayi* var. *hispidula* Gray. Gray's sedge. Known from a single collection: Alum Cave Trail, Sevier County (Underwood 420 at TENN). (Included in *C. grayii* Carey in R.). The collection keys straightforwardly to this taxon (perigynia more than 1 cm long, pistillate spike subglobose to ellipsoid, perigynium dull, base cuneate), although the plant is somewhat out of range here (it has a piedmont-coastal plain distribution; see Radford et al. 1968).
- Carex grisea* Wahl. Sedge. Scarce, wet ground and limestone woods, western GRSM (Blount Co.) (PSW).
- Carex hirsutella* Mackenz. Hirsute sedge. A single collection: Fish Camp Prong, 2,500 ft, Sevier County (Jennison 339 at GRSM). (*C. complanata* Torrey & Hooker in R).
- Carex incompta* Bickn. Sedge. Scarce, seeps, wet meadows, low elevations. Cades Cove (Blount Co.) vicinity of Sugarlands (Sevier Co.), and Hills Creek (Sevier Co.). (Hoffman 1966b).
- Carex intumescens* Rudge. var. *intumescens*. Intumescent sedge. Less common than var. fernaldii, but with a similar distribution. The perigynia are conic-ovoid in the typical variety; laceolate or lance-ovoid in var. fernaldii.

CYPERACEAE (Cont.)

- Carex intumescens* var. *fernaldii* Bailey. Fernald's intumescent sedge. Common, mesic to submesic woods, openings, low to high elevations, throughout. (Included in *C. intumescens* Rudge in R).
- Carex jamesii* Schweinitz. James' sedge. Rare, wooded limestone outcrop, low elevations. Known from a single locale in Cades Cove (Blount Co.) (PSW).
- Carex laevivaginata* (Kukenth.) Mackenz. Sedge. Known from a single collection near the start of the Alum Cave Trail (Sevier Co.; Sharp 1750 at TENN).
- Carex laxiculmis* Schweinitz. Sedge. Known from a single collection: Greenbrier Cove, Sevier County (Bryson 2014 at GRSM; see also Bryson 1980b).
- Carex laxiflora* Lam. Broad-leaved sedge. Frequent, moist woods, low to mid-elevations, throughout. Bryson (1980a) recently monographed the Laxiflorae sedges (*C. laxiflora*, *C. blanda*, *C. purpurifera*, and their relatives).
- Carex leavenworthii* Dewey. Sedge. Rare, known from a single collection: Cades Cove, Blount County. (PSW).
- Carex leptalea* Wahlenb. Sedge. Rare or overlooked, marshes, low elevations. Collected from: Meadow Branch (Blount Co.; Jennison and Smith 4075 at GRSM and TENN) and Deep Creek (Swain Co.; White 2747 at GRSM).
- Carex leptoneura* Fern. Nerved sedge. Frequent, moist woods, balds, openings, mid- to high elevations, throughout.
- Carex louisianica* Bailey. Louisiana sedge. A single collection from Cades Cove (Blount Co.; Sharp et al. 32411, TENN). Similar to *C. lupulina* Muhl. ex Schkuhr, but the leaves only to 6 mm wide (5-12 mm in *C. lupulina*). The rhizomes, needed for determination in R, are not present. (Hoffman 1966 addition).
- Carex lupulina* Muhl. ex Schkuhr. Larger hop sedge. Infrequent, marshes, low elevations. Collected from Cades Cove (Blount Co.).
- Carex lurida* Wahlenb. Smaller hop sedge. Occasional, marshes, streamsides, moist woods, low to high elevations, throughout.
- Carex misera* Buckl. Miserable sedge. Frequent, rocky woods, balds, cliffs, landslide scars, high elevations.
- Carex nigromarginata* Schwein. Black-margined sedge. Scarce, rich woods, low elevations. Collected from Cades Cove (Blount Co.) and near Gatlinburg (Sevier Co.). (Collections at TENN).
- Carex normalis* Mackenz. Sedge. Frequent, seeps, wet ground, mid- to high elevations, throughout. Resembles several other sedges in Section Ovaes; e.g., *C. tribuloides* Wahlenb.; the group is in need of monographic treatment.
- Carex pedunculata* Muhl. Peduncled sedge. Rare, rich, moist, rocky woods, low elevations. Collected from Blount County (see Bryson 1980b). (Not in R).
- Carex pennsylvanica* Lam. var. *pennsylvanica*. Pennsylvania sedge. Common, mesic woods, mid- to upper elevations, throughout.
- Carex pennsylvanica* var. *distans* Peck. Long-beaked Pennsylvania sedge. Common, mesic woods, mid- to upper elevations, throughout.
- Carex physorhyncha* Liebm. Sedge. Apparently rare; collected by Bryson from Andrews Bald (Swain Co.; the specimen immature) and near LeConte Creek (Sevier Co.).
- Carex plantaginea* Lam. Plantain-leaved sedge. Frequent, rich, moist, rocky woods, throughout. One of the few sedges readily identifiable in leaf.

CYPERACEAE (Cont.)

- Carex platyphylla* Carey. Glauous broad-leaved sedge. Rare, rich rocky woods, low elevations (Blount Co., P. S. White 1642, 1714; Sevier Co., P. S. White 1824) (PSW).
- Carex prasina* Wahlenb. Drooping sedge. Scarce or overlooked. Collections from Deals Gap and Laurel Creek (Blount Co.), and the Sinks, Sugarlands, and Greenbrier (Sevier Co.).
- Carex projecta* Mackenz. Sedge. Infrequent, mesic woods, upper elevations. Known from LeConte to Silers Bald area (Sevier and Swain Cos.) (collections at TENN).
- Carex purpurifera* Mackenzie. Purple-based sedge. Infrequent, rich woods, low to mid-elevations, probably throughout but collected only from western GRSM (Blount and Sevier Cos.). (*C. laxiflora* var. *purpurifera* (Mackenzie) Gleason of Hoffman 1964).
- Carex radiata* (Wahlenb.) Dewey. Radiate sedge. Occasional, moist woods, mid- to high elevations, throughout. (Included in *C. rosea* Schkuhr in R).
- Carex rosea* Schkuhr. Roseate sedge. Occasional, moist woods, low to mid-elevations. The collections are from Blount, Cocke, and Sevier Counties.
- Carex ruthii* Mackenzie. Ruth's sedge. Occasional, open, seepage areas, grassy balds, high elevations. (*C. muricata* var. *ruthii* (Mackenzie) Gleason in R).
- Carex scabrata* Schwein. Rough sedge. Frequent, wet ground, seeps, streamsides, low to high elevations, throughout.
- Carex scoparia* Schkuhr. Occasional, moist thickets, fields, low to high elevations. This is in Section Ovales, a group in need of monographic review (TENN).
- Carex sparaganioides* Muhl. Sedge. Apparently rare, known from several collections on limestone at low elevations (Blount Co.) and from Greenbrier Cove (Bryson 2962 at IBE). (PSW).
- Carex squarrosa* L. Round-headed sedge. Occasional, seepage areas, marshes, wet ground along streams, low to mid-elevations, probably throughout but collected from Blount and Sevier Counties.
- Carex stipata* Muhl. ex Schkuhr. Stipate sedge. Occasional, seepage areas, wet ground, low to high elevations, throughout.
- Carex styloflexa* Buckley. Sedge. Occasional, wet to mesic woods, low elevations. Collected from Blount and Sevier Counties (see Bryson 1980a). (Hoffman 1966 b).
- Carex swanii* (Fern.) Mackenz. Swan's sedge. Frequent, submesic woods, low to mid-elevations, throughout.
- Carex texensis* (Torr.) L. H. Bailey. Texas sedge. Collected twice, both from streamsides near Greenbrier (Sevier Co.; TENN). Similar to *C. rosea* Schkuhr in general appearance.
- Carex torta* Boott. Twisted sedge. Frequent, rocky streamsides, low to mid-elevations, throughout.
- Carex tribuloides* Wahlenb. Sedge. Frequent, wet ground, low to high elevations, throughout. Similar to and often confused with *C. normalis* Mackenz.; this group is in need of monographic review.
- Carex trisperma* Dewey. Three-seeded sedge. Scarce, moist woods, low to high elevations. The collections are from Blount and Sevier Counties.
- Carex umbellata* Schkuhr. Umbel sedge. Apparently rare; a single collection by C. T. Bryson: Cades Cove Road, Blount County (at IBE).

CYPERACEAE (Cont.)

Carex virescens Muhl. ex Schkuhr. Sedge. Occasional, wet ground, low to mid-elevations, throughout.

Carex vulpinoidea Michx. Fox. sedge. Frequent, wet ground, seeps, low to mid-elevations, throughout.

Cymophyllus (Gen. 525A)

Cymophyllus fraseri (Andr.) Mackenz. Fraser's sedge. Occasional, mesic woods, often with hemlock, low to mid-elevations; scarce in the western part of the park.

Cyperus (Gen. 459)

Cyperus dipsaciformis Fern. Sparse-flowered umbrella-sedge. Rare or overlooked, the only park collection is "Lower end of Abrams Creek, Blount County" (Sharp S-276 at GRSM).

Cyperus flavescens var. *poaeformis* (Pursh) Fern. Umbrella-sedge. Infrequent, moist thickets, low elevations. Western GRSM (Blount Co.) only. (Not in R).

Cyperus globulosus Aubl. Round-headed umbrella-sedge. Occasional, moist to dry fields, thickets, low elevations. The collections are from Blount and Sevier Counties.

Cyperus polystachyos var. *texensis* (Torr.) Fern. Umbrella-sedge. Frequent roadsides, fields, streamsides, low elevations, throughout.

Cyperus praelongatus Steud. Thin-fruited umbrella-sedge. Occasional, wet ground, low elevations, throughout. (Included in *C. strigosus* L. in R).

Cyperus retrorsus Chapm. Umbrella-sedge. Occasional, moist thickets, low elevations. Western GRSM (Blount, Sevier Cos.)

Cyperus rivularis Kunth. Riverside umbrella-sedge. Infrequent, moist thickets, low elevations. Lower Abrams Creek only (Blount Co.).

Cyperus strigosus L. Umbrella-sedge. Frequent, roadsides, fields, moist thickets, low elevations throughout. A variable species; *C. praelongatus* Steud. may be reducible to this taxon.

Cyperus tenuifolius (Steud.) Dandy. Annual umbrella-sedge. Occasional but easily overlooked, streamsides, wet ground, low elevations, probably throughout.

Dulichium (Gen. 458)

Dulichium arundinaceum (L.) Britt. Three-way sedge. Wet ground, alluvial pools, low elevations. Known only from Cades Cove area at present (Blount Co.).

Eleocharis (Gen. 469)

Eleocharis obtusa (Willd.) Schultes. Spike-rush. Occasional, marshes, streams, low to mid-elevations, throughout.

CYPERACEAE (Cont.)

Fimbristylis (Gen. 471)

Fimbristylis autumnalis (L.) R. & S. Autumn fimbristylis. Scarce, but probably often overlooked, wet, disturbed ground, low elevations (collections from Blount and Swain Counties).

Rhynchospora (Gen. 492)

Rhynchospora capitellata (Michx.) Vahl. Beak-rush. Occasional, wet meadows and streamsides, low elevations. Collected most frequently from Blount County, but also known from Sevier and Swain Cos. (Including *Rhynchospora capitellata* f. *controversa* (S. F. Blake) Gale of Hoffman's list).

Scirpus (Gen. 468)

- Scirpus atrovirens* Willd. Bulrush. Apparently scarce, marshes, low elevations. Known from a single collection: Bryson Place, Swain County (Jennison 1994 at GRSM, TENN). The bristles are straight and inconspicuous, the spikelets ovoid.
- Scirpus cespitosus* var. *callosus* Bigel. Deerhair Bulrush. Rare, cliffs and landslide scars, high elevations. Known only from Mount LeConte (Sevier Co.).
- Scirpus cyperinus* (L.) Kunth. Bulrush. Occasional, marshes, streamsides, low elevations. The collections are from Blount and Sevier Counties. All spikelets are sessile and clustered (see *S. rubricosus* Fern. below).
- Scirpus lineatus* Michx. Lined bulrush. Apparently scarce, wet ground, low elevations. Known from only one collection: Damp ditch, Fall Branch, Sevier County (Underwood, unnumbered, TENN).
- Scirpus polyphyllus* Vahl. Many-leaved bulrush. Occasional, wet ground, low elevations, probably throughout, but the collections are from Blount and Sevier Counties.
- Scirpus rubricosus* Fern. Bulrush. Occasional, marshes, streamsides, low elevations, throughout. Some spikelets peduncled, otherwise very similar to *S. cyperinus* (see above). (Included in *S. cyperinus* (L.) Kunth in R).
- Scirpus validus* Vahl. Great bulrush. Scarce, marshes, ponds, wet ditches, low to mid-elevations. Collected from Cades Cove (Blount Co.), Cataloochee (Haywood Co.), and along Rt. 441 (Sevier Co.) (PSW).

Scleria (Gen. 515)

- Scleria oligantha* Michx. Nut-rush. Rare, limestone woods, low elevations. White Oak Sink (White 2891 at GRSM). (PSW).
- Scleria pauciflora* Muhl. ex Willd. Small-flowered nut-rush. Occasional, dry woods, thickets, fields, low to mid-elevations, probably throughout but collected from Blount and Sevier Counties.
- Scleria triglomerata* Michx. Nut-rush. Frequent, dry woods, low to mid-elevations, probably throughout but the collections are from Blount and Sevier Counties.

DIOSCOREACEAE (Fam. 34)

Dioscorea (Gen. 1252)

**Dioscorea batatas* Dcne. Chinese yam. Common, mesic woods, thickets, old homesites, roadsides, low to mid-elevations, throughout. Native to Asia.

Dioscorea villosa L. Wild yam. Common, mesic to subxeric woods, thickets, low to mid-elevations, throughout. (Including *D. quaternata* Walter ex Gmelin of Hoffman 1964).

GRAMINEAE (see POACEAE)

IRIDACEAE (Fam. 36)

Belamcanda (Gen. 1285)

**Belamcanda chinensis* (L.) DC. Blackberry lily. Rare, roadsides, old fields, low elevations (Blount, Sevier Cos.). Native to E. Asia.

Gladiolus (Gen. 1311)

**Gladiolus gandovensis* Van Houtte. *Gladiolus*. Rare, persistent after cultivation, old homesites, low elevations.

Iris (Gen. 1264)

Iris cristata Ait. Crested dwarf iris. Common, mesic woods, low to mid-elevations, throughout.

**Iris laevigata* Fisch. Garden iris. Scarce, persistent at old homesites, low elevations. (Not in R).

Iris verna var. *smalliana* Fern. Spring dwarf iris. Infrequent, dry woods, low elevations. Two collections, Blount County: Vicinity Scott Gap (Jennison 3759) and Upper Bird Creek (Jennison 286).

Iris virginica var. *shrevei* (Small) E. Anders. Blue flag. Scarce, marshes, low elevations. Cades Cove and Lower Abrams Creek (Blount Co.). (Included in *I. virginica* L. in R).

Sisyrinchium (Gen. 1286)

Sisyrinchium angustifolium Mill. Blue-eyed grass. Frequent, fields, roadsides, balds, openings, low to high elevations, throughout.

Sisyrinchium atlanticum Bickn. Atlantic blue-eyed grass. Occasional, fields, streamsides, low elevations. Collected from Blount and Sevier Counties. (*S. mucronatum* var. *atlanticum* (Bicknell) Shles in R).

Sisyrinchium mucronatum Michx. Blue-eyed grass. Infrequent, fields, low elevations. Cades Cove, Blount County (White 2534 at GRSM). Earlier collections were from outside GRSM.

JUNCACEAE (Fam. 31)

Juncus (Gen. 936)

Juncus acuminatus Michx. **Acuminate** rush. Frequent, wet ground, low to high elevations, throughout.

Juncus biflorus Ell. Two-flowered rush. Rare, wet ground, low elevations. Known only from Cades Cove (Blount Co.).

JUNCACEAE (Cont.)

- Juncus brevicaudatus* (Engelm.) Fernald. Short-caudate rush. Rare, wet ground, high elevations. Known from a single collection by Ramseur (NCU).
- Juncus canadensis* J. Gay ex La Harpe. Canada rush. Apparently scarce, wet ground, low elevations (Lower Abrams Creek, vicinity of White Oak Sink; Blount Co.) (TENN).
- Juncus coriaceus* Mackenz. Coriaceous rush. Frequent, wet ground, low to high elevations, throughout.
- Juncus debilis* Gray. Rush. Occasional, wet ground, low to mid-elevations. Collected from Blount and Swain Counties.
- Juncus effusus* var. *solutus* Fern. & Wieg. Soft rush. Frequent, wet ground, low to high elevations, throughout. (Not in R).
- Juncus gymnocarpus* Coville. Few-seeded rush. Occasional, wet ground, low to mid-elevations. Most collections are from western GRSM (Blount, Swain Cos.).
- Juncus interior* Wieg. Rush. Apparently scarce. Collections from Blount, Sevier, and Swain Counties have been placed in this taxon, in *J. dichotomus* Ell., or in *J. dudleyi* Wieg. In many specimens the leaf sheath auricles are prolonged and distinct, and hence the plants are probably best placed in *J. tenuis* Willd. In others, the situation is ambiguous, in part due to fraying and drying of the leaf sheaths. Some intact sheath auricles do display the rounded character of the *interior-dudleyi-dichotomus* group, and other characteristics suggest *J. interior* as the appropriate designation. Further collection is required. (Hoffman 1966b; not in R).
- Juncus marginatus* Rostk. Margined rush. Infrequent but well distributed in wet ground, low to high elevations.
- Juncus tenuis* Willd. var. *tenuis*. Path rush. Common, trailsides, fields, balds, thickets, low to high elevations, throughout.
- Juncus tenuis* var. *anthelatus* Wieg. Larger path rush. Frequent, trailsides, fields, balds, moist thickets, low to high elevations, throughout (Hoffman 1966b; not in R).
- Juncus trifidus* var. *monanthos* (Jacq.) Bluff & Fingerhuth. Dwarf rush. Very rare and possibly extirpated. Known from a single collection, cliff face, Mount LeConte (Sevier Co., the only Tennessee collection--White (1982); specimen at DUKE). (*Juncus trifidus* ssp. *carolinianus* Hamet Aht.).

Luzula (Gen. 937)

- Luzula acuminata* Raf. Wood-rush. Frequent, mesic to submesic woods, low to mid-elevations, throughout. Plants matching *Luzula acuminata* var. *carolinae* (S. Wats.) Fern. (inflorescence compound) have also been collected in the park.
- Luzula echinata* (Small) F. J. Herm. Wood-rush. Common, mesic to submesic woods, balds, low to high elevations, throughout. Several collections were originally placed in *L. bulbosa* (Wood) Rydb.; however, the glomerules are subglobose and the leaf bases, though swollen, scarcely have bulblets associated with them. Hence they are here treated as *L. ecinata*.
- Luzula multiflora* (Retz.) Lej. Wood-rush. A single collection has been recently determined as this taxon: vicinity Deals Gap, 1,800 ft, Blount County (Jennison 2246 at TENN and GRSM). The perianth exceeds the capsule, but the latter are not mature. The glomerules are, however, short cylindric, and secondary pedicels are absent.

LEMNACEAE (Fam. 25)

Lemna (Gen. 795)

Lemna valdiviana Philippi. Duckweed. Rare, sewage lagoon near Tremont (Blount Co.) (PSW). The plants were sterile and the determination is tentative.

LILIACEAE (Fam. 32)

Aletris (Gen. 1143)

Aletris farinosa L. Colic root. Occasional, dry woods and thickets, low to mid-elevations, throughout.

Allium (Gen. 1049)

Allium canadense L. Wild garlic. Occasional, fields, roadsides, low elevations. The collections are from Cades Cove (Blount Co.).

Allium tricoccum Ait. Ramps, wild leeks. Frequent, rich, moist woods at mid-elevations, throughout.

**Allium vineale* L. Field garlic. Occasional, old fields, roadsides, pastures, low elevations, probably throughout. Native to Europe.

Amianthium (Gen. 955)

Amianthium muscaetoxicum (Walt.) Gray. Fly poison. Occasional, moist woods, high elevations. More common in eastern GRSM.

Asparagus (Gen. 1113)

**Asparagus officinalis* L. Wild asparagus. Rare weed, roadsides, low elevations. (Sevier Co.) (PSW). Native to Eurasia.

Chamaelirium (Gen. 950)

Chamaelirium luteum (L.) Gray. Fairy wand. Frequent, submesic woods and thickets, low to mid-elevations, throughout.

Clintonia (Gen. 1117)

Clintonia borealis (Ait.) Raf. Bluebead lily. Common, moist woods, high elevations.

Clintonia umbellulata (Michx.) Morong. Umbellate clintonia, speckled wood lily. Frequent, mesic to submesic woods, mostly at mid-elevations, throughout.

Convallaria (Gen. 1128)

**Convallaria majalis* L. Lily-of-the-valley. - Scarce, persistent after cultivation, low to mid-elevations. Native to Europe.

Convallaria montana Raf. Wild lily-of-the-valley. Scarce, mesic woods, mid-elevations, eastern GRSM (Cocke and Haywood Cos.) only. (*C. majalis* var. *montana* (Raf.) Ahles in R).

LILIACEAE (Cont.)

Disporum (Gen. 1120)

Disporum lanuginosum (Michx.) Nicholson. Yellow mandarin. Common, mesic woods, coves, low to mid-elevations, throughout.

Disporum maculatum (Buckl.) Britt. Spotted mandarin. Scarce, dry woods, usually over limestone, low elevations (Blount Co.).

Erythronium (Gen. 1076)

Erythronium americanum Ker. Trout-lily. Common, moist woods, low to high elevations throughout. Following the treatment of Parks and Hardin (1963), *E. umbilicatum* Parks & Hardin ssp. *umbilicatum* and *E. umbilicatum* ssp. *monostolum* Parks & Hardin are present in GRSM, and *E. americanum* Ker., sensu strictu, is absent. However, not all specimens could be adequately determined using the criteria of Parks and Hardin; hence our plants are placed in *E. americanum* sensu latu until the situation is further resolved.

Hemerocallis (Gen. 1019)

**Hemerocallis fulva* L. Orange day-lily. Occasional, vicinity of old homesites, sometimes spreading, roadsides, marshy ground, low elevations, throughout. Native to Eurasia.

Lilium (Gen. 1072)

Lilium canadense var. *editorum* Fern. Canada lily. Rare, moist meadow near an old homesite, low elevation (Sevier Co.). Perhaps introduced. (Included in *L. canadense* L. in R).

Lilium grayi Wats. Gray's lily. Very rare and possibly extirpated, known from only a single collection ("open woods, Swain Co., 3000-6000 ft", Beardslee and Kofoed, unnumbered, 7/25/1891, at Chicago Field Museum).

Lilium michauxii Poir. Carolina lily. Frequent, submesic to subxeric woods, low to mid-elevations, throughout.

Lilium philadelphicum L. Philadelphia wood lily. Scarce, submesic woods at mid-elevations. Known only from Forney Ridge (Swain Co.).

Lilium superbum L. Turk's cap lily. Common and widely distributed, moist woods, balds, trailside thickets, low to high elevations, throughout.

**Lilium tigrinum* L. Tiger lily. Rare introduction at or near old homesites (Cades Cove, Blount Co., only). Native to E. Asia.

Maianthemum (Gen. 1119)

Maianthemum canadense Desf. Wild lily-of-the-valley, mayflower. Occasional, mesic to submesic woods, generally at mid-elevations; more frequent in eastern GRSM.

Medeola (Gen. 1135)

Medeola virginiana L. Indian cucumber. Common, mesic to subxeric woods, low to high elevations, throughout.

LILIACEAE (Cont.)

Melanthium (Gen. 959)

Melanthium hybridum Walt. Bunch-flower. Rare, mesic to submesic woods, low to mid-elevations (Blount, Sevier, and Swain Cos.). (Veratrum hybridum (Walt.) Zimmerman of Hoffman 1964).

Muscari (Gen. 1095)

**Muscari botryoides* (L.) Miller. Grape hyacinth. Rare, persistent after cultivation and spreading in lawns. Known only from Twin Creeks (Sevier Co.) (PSW). Native to Europe.

Ornithogalum (Gen. 1089)

**Ornithogalum umbellatum* L. Star-of-Bethlehem. Rare, lawns, low elevations. Known only from Twin Creeks Area (Sevier Co.) (PSW). Native to Europe.

Polygonatum (Gen. 1123)

Polygonatum biflorum (Walt.) Ell. Smooth Solomon's seal. Common, moist woods, low to mid-elevations, throughout.

Polygonatum canaliculatum (Muhl.) Pursh. Great Solomon's seal. Occasional, moist thickets, woods, low to mid-elevations, throughout. Perhaps just a robust form of *P. biflorum*. (Included in *P. biflorum* (Walt.) Ell. in R).

Polygonatum pubescens (Willd.) Pursh. Hairy Solomon's seal. Frequent, moist woods, coves, low to high elevations, throughout.

Smilacina (Gen. 1118)

Smilacina racemosa (L.) Desf. False Solomon's seal. Common, moist woods and thickets, except at the highest elevations, throughout.

Smilax (Gen. 1151)

Smilax bona-nox L. Cat-brier. Rare, woods and thickets at low elevations. Lower Abrams Creek (Blount Co.) only. (PSW). A marginal rib runs along the edge of the leaf.

Smilax ecirrhata var. *biltmoreana* (Small) Ahles. Carrion flower. Occasional, submesic woods, low to mid-elevations, throughout.

Smilax glauca (L.) Walt. Glaucous catbrier. Common, submesic to xeric woods, thickets, except at the highest elevations, throughout.

Smilax herbacea L. Carrion flower. Occasional, mesic woods and thickets, low to high elevations, throughout.

Smilax hugeri Small. Huger's carrion flower. Rare, limestone woods, low elevations. Known from Rich Mountain Gap area and White Oak Sink (Blount Co.) (PSW). (*Smilax ecirrhata* var. *hugeri* (Small) Ahles in R).

Smilax rotundifolia L. Greenbrier. Common, submesic to xeric woods, thickets except at the highest elevations, throughout.

Smilax tamnoides var. *hispida* (Muhl.) Fern. Bristly greenbrier. Frequent, submesic to xeric woods, thickets, except at the highest elevations, throughout. (*S. hispida* Muhl. in R).

LILIACEAE (Cont.)

Stenanthium (Gen. 957)

Stenanthium gramineum (Ker.) Morong. Featherbells. Frequent, mesic to subxeric woods, thickets, streamsides, balds, low to high elevations, throughout. (Including *Stenanthium gramineum* var. *robustum* (S. Wats.) Fern.).

Streptopus (Gen. 1121)

Streptopus amplexifolius var. *americanus* Schultes. Twisted stalk. Rare, moist woods, high elevations. Mount LeConte and Clingmans Dome area (Sevier, Swain Cos.; see White 1982). (Included in *S. amplexifolius* (L.) DC. in R).

Streptopus roseus Michx. Rose twisted-stalk. Frequent, moist woods, mid- to high elevations, throughout. In the typical variety, pedicels are glabrous. Plants with ciliate pedicels have also been collected in GRSM and have been segregated as *Streptopus roseus* var. *perspectus* Fassett.

Trillium (Gen. 1138)

Trillium catesbaei Ell. Catesby's trillium. Frequent, mesic to subxeric woods, low to mid-elevations, western GRSM (Blount and Swain Co.). Surprisingly, absent eastward in GRSM, given its abundance in western areas.

Trillium cuneatum Raf. Sessile-flowered maroon trillium. Scarce, moist woods, low elevations. Lower Abrams Creek area (Blount Co.) only. Flowers with some purple pigments, petals purplish, brownish, greenish, or rarely yellow (see *T. luteum*). (See Freeman (1975); some intermediates with *T. luteum* may be hybrids).

Trillium erectum L. var. *erectum*. Wake robin. Frequent, mesic woods, mid- to high elevations, throughout. The typical variety is maroon-petaled and is conspicuous at higher elevations. It is, in general, less common than the white-petaled form (see below). Since the maroon form dominates northward, it always surprises northern botanists to see the abundance of white-petaled *Trillium erectum* here. Tom Patrick is monographing this group.

Trillium erectum f. *albiflorum* R. Hoffm. White wake robin. Common, mesic woods, low to high elevations, throughout. (Not in R).

Trillium erectum var. *blandum* Jennison. Jennison's white trillium. Rare, mesic woods, low elevations. Apparently known from only one site (Deep Creek area, Swain Co.). (Not in R).

Trillium erectum f. *luteum* Louis-Marie. Pale erect trillium. Frequent, moist woods, high elevations, throughout. (Not in R). The petals are a cream or yellowish white (sometimes with a maroon tinge).

Trillium grandiflorum (Michx.) Salisb. White trillium. Common, mesic woods, coves, low to mid-elevations, throughout.

Trillium luteum (Muhl.) Harbison. Yellow trillium. Frequent, moist woods, low elevations, more common on the Tennessee side of the park. Flowers with no purple pigments, petals pure yellow or greenish yellow (see *T. cuneatum*; Freeman (1975); some intermediates with *T. cuneatum* may be hybrids). (*T. cuneatum* var. *luteum* (Muhl. Ahles in R).

LILLIACEAE (Cont.)

- Trillium rugelii* Rendle. Southern nodding trillium. Scarce, moist woods, thickets, especially along streams, mostly at lower elevations. Formerly confused with *T. cernuum* L. (Tom Patrick, personal communication). (*T. cernuum* var. *macranthum* Wieg. in Hoffman 1964; not in R).
- Trillium undulatum* Willd. Painted trillium. Frequent, submesic to xeric woods, low to high elevations, throughout.
- Trillium vaseyi* Harb. Vasey's trillium. Frequent, moist woods, low to mid-elevations, throughout. A large, spectacularly flowered plant, this species blooms after *T. erectum* in the park. (*T. erectum* var. *vaseyi* (Harb.) Ahles in R). White forms of Vasey's trillium are particularly confusing (they resemble *T. rugelii* Rendle) and have been placed in *T. vaseyi* var. *simile* (Gleason) Bark. This group of trilliums is being monographed by Tom Patrick, University of Tennessee.

Uvularia (Gen. 966)

- Uvularia grandiflora* Sm. Large-flowered bellwort. Frequent, rich, moist woods, low to mid-elevations, throughout.
- Uvularia perfoliata* L. Perfoliate bellwort. Frequent, usually in submesic to subxeric woods, low to mid-elevations. *U. grandiflora*, a larger plant occurring in coves (moister sites, in general, than *U. perfoliata*), also has perfoliated leaves.
- Uvularia pudica* (Walt.) Fern. Mountain bellwort. Frequent, submesic to subxeric woods, low to mid-elevations, throughout. (Including *U. pudica* var. *nitida* (Britt.) Fern.).
- Uvularia sessilifolia* L. Wild oats. Occasional, submesic woods, mostly at mid-elevations, throughout. The leaves are glaucous beneath, the ovary and capsule stalked above the receptacle, and the styles separate well below the middle (leaves green beneath, the ovary and capsule sessile, and the styles free only in upper one-third to one-fourth in *U. pudica* (Walt.) Fern.); the herbarium specimens are ambiguous on these points but I have seen convincing fresh material.

Veratrum (Gen. 960)

- Veratrum parviflorum* Michx. Small-flowered false hellebore. Common, submesic woods, low to mid-elevations, throughout.
- Veratrum viride* Ait. False hellebore. Frequent, seepage springs, moist thickets, high elevations, throughout.

Yucca (Gen. 1103)

- Yucca smalliana* Fern. Adam's-needle. Occasional, dry woods, roadsides, old homesites, low elevations. Perhaps the majority of the sites are the result of human introductions (or plants spread from direct plantings). However, on the dry slopes of the Little River Gorge, the plants appear native.

ORCHIDACEAE (Fam. 39)

Aplectrum (Gen. 1642)

Aplectrum hyemale (Muhl. ex Willd.) Nutt. Adam-and-Eve orchid. Moist woods, low to mid-elevations, throughout.

Calopogon (Gen. 1434)

Calopogon tuberosus (L.) Britt., Sterns, & Poggenb. Grass-pink. Infrequent, but well-collected, wet, open ground, dry woods, thickets, low to mid-elevations, throughout. (*C. pulchellus* (Salisb.) R. Br.).

Cleistes (Gen. 1465)

Cleistes divaricata var. *bifaria* Fern. Spreading pogonia. Scarce, dry woods, thickets, low to mid-elevations, throughout. (Included in *C. divaricata* (L) Ames in R).

Coeloglossum (Gen. 1422)

Coeloglossum viride var. *virescens* (Muhl.) Luer. Bracted green-orchid. Rare, moist woods, mid-elevations. Known from a single collection: Den Branch, Haywood County (Barksdale, unnumbered at NCU). (*Habenaria viridis* var. *bracteata* (Muhl. ex Willd.) Gray.

Corallorhiza (Gen. 1548)

Corallorhiza odontorhiza (Willd.) Nutt. Autumn coralroot. Frequent, mesic to submesic woods, thickets, low to mid-elevations, throughout.

Corallorhiza wisteriana Conrad. Spring-flowered coralroot. Rare, limestone woods, low elevations (Cades Cove, White Oak Sink--Blount Co.--only). (TENN).

Cypripedium (Gen. 1391)

Cypripedium acaule Ait. Pink lady's slipper. Frequent, subxeric to xeric woods, low to mid-elevations, throughout.

Cypripedium acaule f. *albiflorum* Rand. & Redf. White-flowered lady's slipper. Occasional, with the pink form. (Not in R).

Cypripedium calceolus var. *parviflorum* (Salisb.) Fern. Small-flowered yellow lady's slipper. Occasional, moist to dry woods, low to mid-elevations, throughout. (Included in *C. calceolus* var. *pubescens* (Willd.) Correll in R).

Cypripedium calceolus var. *pubescens* (Willd.) Correll. Yellow lady's slipper. Occasional, moist to dry woods, low to mid-elevations, throughout.

Galearis (Gen. 1396)

Galearis spectabilis (L.) Raf. Showy orchis. Common, mesic woods, trailsides, thickets, old homesites, low to mid-elevations, throughout. (*Orchis spectabilis* L.).

Goodyera (Gen. 1504)

Goodyera pubescens (Willd.) R. Br. Downy rattlesnake-plantain. Common, submesic to xeric woods, low to mid-elevations, throughout.

ORCHIDACEAE (Cont.)

Goodyera repens var. *ophioides* Fern. Lesser rattlesnake-plantain. Infrequent, moist woods, mid- to high elevations, eastern GRSM (Cocke, Sevier, Haywood, Swain Cos.).

Hexalectris (Gen. 1629)

Hexalectris spicata (Walt.) Barnh. Crested coralroot. Occasional, dry woods, low elevations, probably throughout, but collected from Blount and Sevier Counties.

Isotria (Gen. 1467)

Isotria verticillata (Muhl. ex Willd.) Raf. Whorled pogonia. Scarce, submesic to xeric woods, low to mid-elevations, probably throughout.

Liparis (Gen. 1556)

Liparis lilifolia (L.) Richard ex Lindley. Lily-leaved twayblade. Frequent, moist thickets, streamsides, low elevations, throughout.

Listera (Gen. 1494)

Listera smallii Wieg. Small's twayblade. Scarce, moist thickets, generally at mid-elevations. Only known from central and eastern GRSM (Cocke, Sevier, Haywood, Swain Cos.).

Malaxis (Gen. 1552)

Malaxis unifolia Michx. Adder's mouth. Frequent, but easily overlooked, moist to dry woods, thickets, low to high elevations.

Platanthera (Gen. 1422)

Platanthera ciliaris (L.) Lindley. Yellow-fringed-orchid. Common, dry woods and thickets, low to mid-elevations, throughout. (*Habenaria ciliaris* (L.) R. Br.).

Platanthera clavellata (Michx.) Luer. Green woodland orchid. Frequent, moist, often mossy areas along streams, seepage areas, low to high elevations, throughout. (*Habenaria clavellata* (Michx.) Spreng.).

Platanthera grandiflora (Big.) Lindley. Larger purple-fringed orchid. Occasional, moist thickets, trailsides, roadsides, high elevations. (*Habenaria psycodes* var. *grandiflora* (Bigel.) Gray).

Platanthera lacera (Michx.) G. Don. Green fringed-orchid. Rare. Swamp near Sugarlands, discovered by Don DeFoe in June 1981. Previous reports are based on specimens outside the park. (*Habenaria lacera* (Michx.) Lodd.).

Platanthera peramoena A. Gray. Purple fringeless orchid. Rare, wet meadow, low elevations. Cades Cove (Blount Co.). A second collection (without collector or date, at TENN) is from Gregory Ridge Trail, 4,500 ft (Blount Co.). (*Habenaria peramoena* Gray).

Platanthera psycodes (L.). Purple-fringed orchid. Occasional, moist woods and thickets, trailsides, roadsides, high elevations. (*Habenaria psycodes* (L.) Spreng.).

ORCHIDACEAE (Cont.)

Pogonia (Gen. 1464)

Pogonia ophioglossoides (L.) Juss. *Pogonia*. Rare; known from a single collection: Mt. Sterling--in rich soil; Haywood County (Ruth, unnumbered, 8/11/08, at TENN).

Spiranthes (Gen. 1490)

Spiranthes cernua (L.) Richard. Nodding lady's tresses. Frequent, moist to dry fields and thickets, low to high elevations, throughout. (Including specimens formerly labeled *S. odorata* (Nutt.) Lindl.).
Spiranthes lacera var. *gracilis* (Big.) Luer. Slender lady's tresses. Occasional, fields, openings, low to mid-elevations, throughout. (*S. gracilis* (Bigel.) Beck).
Spiranthes tuberosa Raf. Little lady's tresses. Occasional, fields, thickets, low to mid-elevations. (Including *S. beckii* Lindl.; *S. grayii* Ames).
Spiranthes vernalis Engelm. & Gray. Early lady's tresses. Occasional, fields, low to mid-elevations, throughout.

Tipularia (Gen. 1560)

Tipularia discolor (Pursh) Nutt. Crane-fly orchid. Frequent, mesic woods, low to mid-elevations, throughout.

Triphora (Gen. 1466)

Triphora trianthophora (Sw.) Rydb. Nodding pogonia. Occasional, mesic woods, low to mid-elevations, throughout.

POACEAE (Gramineae; Fam. 22)

Agropyron (Gen. 405)

**Agropyron repens* (L.) Beauv. Witch grass. Occasional, fields, roadsides, balds, low to high elevations, throughout. Native to Europe.

Agrostis (Gen. 242)

**Agrostis alba* L. Redtop. Common, fields, roadsides, balds, open trailsides, low to high elevations, throughout. Similar to *A. tenuis* Sibthorp, but the ligules are longer than broad (broader than long in *A. tenuis*) and greater than 2.5 mm long (1.5 mm or less long in *A. tenuis*). Native to Eurasia. (*A. stolonifera* L. in R).
Agrostis borealis var. *americana* (Scribn.) Fern. Northern agrostis. Scarce, wet meadows, rocky streamsides, low elevations, western GRSM (Blount Co.). Plants with lemmas bearing a bent awn ca 2 mm long occur in western Cades Cove and the upper stream gorge of Abrams Creek. These key to *A. borealis* var. *americana*; however, the habitat is an unlikely one, and further work is needed.
Agrostis elliottiana Schult. Elliott's bentgrass. Rare or overlooked; known from a single collection: Greenbrier, Sevier County (Cain 500 at TENN). The lemma awn is greater than 4 mm long and cottony.
Agrostis hyemalis (Walt.) BSP. Hairgrass. Occasional, roadsides, trailsides, low to high elevations, probably throughout but the collections are from Blount and Sevier Counties. Similar to *A. scabra* Willd. but the spikelets are less than 2 mm long.

POACEAE (Cont.)

- Agrostis perennans* (Walt.) Tuckerm. Upland bent. Common, moist woods, fields, trailsides, balds, low to high elevations, throughout. Including *Agrostis perennans* var. *aestivales* Vasey (Hoffman 1966b) and *Agrostis perennans* f. *atherophora* Fern. (Hoffman 1966b).
- Agrostis scabra* Willd. Rough hairgrass. Scarce, wet meadows, streamsides, low to mid-elevations. Collected from Blount and Swain Counties. The paleas are obsolete, the panicle branches spinulose-scabrous, the lemmas awnless and the spikelets greater than 2 mm long. (Included in *A. hyemalis* (Walt.) BSP in R).
- **Agrostis tenuis* Sibthorp. Rhode Island bent. Rare or overlooked; the single collection is from a high elevation disturbed area (Haywood County) (Ramseur 3793 at NCU). Native to Europe. (See *A. alba* L. above.)

Alopecurus (Gen. 225)

- Alopecurus carolinianus* Walter. Carolina foxtail. Rare, two collections: one, wet soil near LeConte Lodge, Sevier County (P. S. White 2066 at GRSM). The specimen bears several characteristics of note: These plants are diminutive (culms to 20 cm long) and decumbent. The awns are scarcely exerted and less than 2 mm long. However, the awns are attached to the lemma one-third of the distance from the base (a characteristic of *A. carolinianus*). Since the plants were collected from a partially shaded seep very near LeConte Lodge (6,400 ft), it is assumed they represent a small form of *A. carolinianus* and were recently introduced there. The second collection is from Haywood County. (PSW).

Andropogon (Gen. 134)

- Andropogon gerardii* Vitman. Big bluestem. Apparently rare in the park, dry open woods, low to mid-elevations. Collected only from Dalton Gap (Swain Co.) and White Oak Sink and Lower Abrams Creek (Blount Co.).
- Andropogon glomeratus* (Walt.) BSP. Marsh broomsedge. Infrequent, marshes, low elevations. Known only from Cades Cove and Meadow Branch (Blount Co.). (Included in *A. virginicus* L. in R).
- Andropogon scoparius* Michx. Little bluestem. Common, dry woods, trailsides, low to mid-elevations, throughout. (*Schizachyrium scoparium* (Michx.) Nash).
- Andropogon ternarius* Michx. Bluestem. Apparently rare; known from a single collection (DeSelm 910), Greenbrier, roadside (Sevier Co.).
- Andropogon virginicus* L. Broomsedge. Occasional, fields, balds, low to high elevations, probably throughout. (Including *A. virginicus* var. *hirsutior* (Hack.) Hitchc. of Hoffman 1964).

Anthroxanthum (Gen. 205)

- **Anthroxanthum odoratum* L. Sweet vernal grass. Frequent, roadsides, fields, open trailsides, low to high elevations, throughout. Native to Europe.

Arrhenatherum (Gen. 275)

- **Arrhenatherum elatius* (L.) Presl. Infrequent, roadsides, fields, low to mid-elevations, probably throughout. Native to Europe.

POACEAE (Cont.)

Arundinaria (Gen. 414)

Arundinaria gigantea (Walt.) Muhl. Cane. Occasional, wet ground along streams, low elevations, throughout. (*A. tecta* (Walt.) Muhl.)

Avena (Gen. 273)

**Avena sativa* L. Oats. Scarce, old fields, low elevations, spread from cultivated plants (Sevier Co.). Native to Eurasia.

Brachyelytrum (Gen. 216)

Brachyelytrum erectum (Schreb.) Beauv. *Brachyelytrum*. Frequent, mesic woods and thickets, low to high elevations, throughout.

Bromus (Gen. 389)

Bromus ciliatus L. Northern brome grass. Very rare and perhaps extirpated. A single site along the Appalachian Trail, Mt. Buckley (Sevier and Swain Cos.)

**Bromus commutatus* Schrad. Common brome grass. Frequent, roadsides, fields, low to high elevations, probably throughout. Native to Europe.

**Bromus japonicus* Thunb. Japanese chess. Occasional, fields and roadsides, low elevations to high elevations, probably throughout. Native to Eurasia.

Bromus purgans L. Native brome grass. Frequent, submesic to subxeric woods, low to mid-elevations, probably throughout but most conspicuous in limestone woods of western GRSM. (Including *Bromus purgans* f. *laevivaginatus* Wieg. of Hoffman 1964).

**Bromus secalinus* L. Cheat grass. Apparently scarce; known from a single collection "near Gatlinburg" (Cain 511, TENN) (Sevier Co.). Native to Europe. (Not in Hoffman 1964, 1966b).

**Bromus tectorum* L. Brome grass. Scarce, roadsides, low elevations. Cades Cove (Blount Co.; White 1894 at GRSM). (PSW). Native to Europe.

Calamagrostis (Gen. 247)

Calamagrostis cainii Hitchc. Cain's reed-bent grass. Rare, a strict endemic to Mt. LeConte, where found on cliffs and landslide scars at high elevations (Sevier Co.). (Not in R).

Calamagrostis cinnoides (Muhl.) Bart. Reed-bent grass. Scarce, marshes, wet fields, low elevations. Known only from Cades Cove (Blount Co.).

Cinna (Gen. 241)

Cinna arundinacea L. Reedgrass. Apparently scarce, swamps, wet fields, low elevations (Blount, Sevier Cos.).

Cinna latifolia (Trev.) Griseb. Woodreed. Common, moist woods, thickets, low to high elevations, throughout.

POACEAE (Cont.)

Cynodon (Gen. 282)

- **Cynodon dactylon* (L.) Pers. Bermuda grass. Frequent, roadsides, fields, low elevations, throughout. Native to Europe.

Dactylis (Gen. 372)

- **Dactylis glomerata* L. Orchard grass. Common, roadsides, fields, balds, low to high elevations, throughout. Native to Europe.

Danthonia (Gen. 280)

- Danthonia compressa* Austin. Mountain oat grass. Common, submesic to subxeric woods, balds, low to high elevations, throughout.
- Danthonia epilis* Scribn. Oat grass. Scarce or overlooked. Two collections at TENN (Cocke, Swain Cos.) are annotated here but with the added note, "poor specimen". Better collections are needed for verification. (*Danthonia sericea* var. *epilis* (Scribner) Gleason in R).
- Danthonia sericea* Nutt. Downy oat grass. Infrequent, open woods, low to mid-elevations, throughout.
- Danthonia spicata* (L.) Beauv. ex R. & S. Poverty grass. Infrequent, open places, submesic to xeric woods, low to high elevations, throughout.

Digitaria (Gen. 163)

- **Digitaria ischaemum* (Schreb.) Schreb. ex Muhl. Smooth crabgrass. Occasional, roadsides, fields, low to mid-elevations, throughout. Native to Europe.
- **Digitaria sanguinalis* (L.) Scop. Crabgrass. Frequent, fields, roadsides, low elevations, throughout. Native to the Old World.

Echinochloa (Gen. 169C)

- **Echinochloa colonum* (L.) Link. Barnyard grass. Rare, recently introduced in roadfill along Rt. 73 (Sevier Co.) (PSW). Native to Old World.
- **Echinochloa crusgalli* (L.) Beauv. Common barnyard grass. Occasional, fields, marshes, low elevations, probably throughout. Native to the Old World. (*E. muricata* (Beauv.) Fern.)

Eleusine (Gen. 304)

- **Eleusine indica* (L.) Gaertn. Wiregrass. Occasional, roadsides, lawns, low elevations, probably throughout. Native to the Old World.

Elymus (Gen. 411)

- Elymus riparius* Wiegand. Wild rye. Very rare and perhaps extirpated. Known from a single collection along the Appalachian Trail at Mt. Buckley (Jennison 4672, TENN, GRSM: Sevier and Swain Cos.).
- Elymus virginicus* L. Wild rye. Frequent and variable, roadsides, balds, moist thickets, streamsides, low to high elevations, throughout. (Including the following subspecific taxa: *Elymus virginicus* var.

POACEAE (Cont.)

australis (Scribn. & Ball) Hitch. (TENN); Elymus virginicus var. glabriflorus (Vasey) Bush (Hoffman 1964); and Elymus virginicus f. hirsutiglumis (Scribn.) Fern. (Hoffman 1964).

Eragrostis (Gen. 341)

- Eragrostis frankii* C. A. Meyer. Small lovegrass. Scarce, roadsides, low elevations; collected from Blount, Cocke, and Sevier Counties. (PSW).
Eragrostis hypnoides (Lam.) BSP. Creeping lovegrass. Scarce, shores, seeps, low elevations. Known from Cades Cove (Blount Co.) and Deep Creek area (Swain Co.) at present.
Eragrostis spectabilis (Pursh) Steud. Tumblegrass. Occasional, roadsides, fields, low elevations, probably throughout.

Erianthus (Gen. 112)

- Erianthus alopecuroides* (L.) Ell. Beardgrass. Scarce, wet ground, low elevations. Collected from Sevier and Swain Counties.
Erianthus giganteus (Walt.) Muhl. Tall beardgrass. Rare, known only from wet meadows in Cades Cove (Blount Co.) (Hoffman 1966b).

Festuca (Gen. 385)

- Festuca dertonensis* (All.) Asch. & Graeb. Fescue. Rare or overlooked; known from a single collection, old field, 2,500 ft (Jennison 414, TENN), Sevier County. (Not in R).
 **Festuca elatior* L. Tall or meadow fescue. Common, roadsides, fields, low to mid-elevations, throughout. Native to Europe. (Including F. arundinacea Schreb.).
Festuca obtusa Biehl. Woodland fescue. Frequent, mesic to submesic woods, low to high elevations, throughout.
Festuca octoflora Walt. Annual fescue. Infrequent, fields, low elevations. The only collections are from Elkmont and vicinity of Gatlinburg (Sevier Co.).
 **Festuca ovina* L. Sheep's-fescue. Rare, pastures, low elevations. Known only from Twin Creeks (Sevier Co.) (PSW). Native to Eurasia.
 **Festuca rubra* L. Red fescue. Scarce, disturbed ground. Introduced on Mt. LeConte (Sevier Co.). Native to E. U.S. (PSW).

Glyceria (Gen. 383)

- Glyceria melicaria* (Michx.) F. T. Hubbard. Wood mannagrass. Frequent, moist woods, mid- to high elevations, throughout.
Glyceria nubigena W. A. Anders. Smoky Mountain mannagrass. Infrequent, seeps, balds, streamsides, even roadside ditches, high elevations. Endemic to the Great Smoky Mountains. Known from the vicinity of Mt. LeConte to Clingmans Dome (Sevier and Swain Cos.).
Glyceria striata (Lam.) Hitchc. Striate mannagrass. Frequent, streamsides, marshes, seeps, low to high elevations, throughout.

Holcus (Gen. 251)

- **Holcus lanatus* L. Velvet grass. Frequent, moist roadsides, fields, low to high elevations, throughout. Native to Europe.

POACEAE (Cont.)

Hordeum (Gen. 410)

Hordeum pusillum Nutt. Little barley. Rare, known from a single collection from Little River Gorge, roadside bluff (Sharp 26805, TENN).

Hystrix (Gen. 412)

Hystrix patula Moench. Bottlebrush. Occasional, moist woods, low to high elevations, throughout.

Leersia (Gen. 194)

Leersia oryzoides (L.) Swartz. Rice cutgrass. Rare; known from a single collection, near Big Cove (Swain Co.) (Underwood and Hoffman, unnumbered, 9/8/62, GRSM).

Leersia virginica Willd. Virginia cutgrass. Occasional, marshes, wet thickets, old homesites, low to mid-elevations, throughout.

Lolium (Gen. 395)

**Lolium multiflorum* Lam. Italian ryegrass. Occasional, fields, roadsides, disturbed ground. Native to Europe.

**Lolium perenne* L. Perennial ryegrass. Occasional, fields, roadsides, disturbed ground. Native to Europe.

Microstegium (Gen. 113)

**Microstegium vimineum* (Trin.) A. Camus. *Microstegium*. Common, roadsides, trailsides, moist woods, low elevations, throughout. Apparently spreading. The conspicuous emerald green grass in Cades Cove grazed woodlands in spring. A potential threat to some native communities. Native to E. Asia. (*Eulalia viminea* (Trin.) Kuntze).

Milium (Gen. 213)

Milium effusum L. Wild millet. Rare, mesic woods and thickets, high elevations. Two collections: Mt. LeConte (Sevier Co.; a state record for Tennessee, White 1982) and Swain Co. (Radford et al. 1968).

Miscanthus (Gen. 110)

**Miscanthus sinensis* var. *gracillimus* Hitchc. *Miscanthus*. Rare introduction in GRSM, roadside, low elevation. Near Davenport Gap and Greenbrier (Sevier Co.). Native to E. Asia.

Muhlenbergia (Gen. 215)

Muhlenbergia frondosa (Poir.) Fernald. Rare, known only from a single site along Rt. 441, below Newfound Gap (Sevier Co., Rogers 42387, TENN: not on Hoffman list).

Muhlenbergia schreberi J. F. Gmel. Drop-seed. Common, moist woods, thickets, low elevations, throughout.

Muhlenbergia sylvatica (Torr.) Torr. ex Gray. Rare; the only collection is from Rabbit Creek in the Lower Abrams Creek area. (Jennison 927, TENN).

POACEAE (Cont.)

Muhlenbergia tenuiflora (Willd.) BSP. Rare; the only collections are from White Oak Sink (Blount Co.).

Panicum (Gen. 166)

Panicum agrostoides Spreng. Panic grass. Apparently rare, moist thickets, low elevations. The single collection is from near Abrams Falls, Blount County (Berry 11976 at TENN). Similar to *P. anceps* Michx. but the panicle is oval in outline and stems are cespitose.

Panicum anceps Michx. Panic grass. Frequent, thickets near streams and old homesites, low elevations, throughout.

Panicum boscii Poir. Panic grass. Common, dry woods, low to mid-elevations, throughout.

Panicum clandestinum L. Panic grass. Frequent, thickets, roadsides, low elevations, throughout. Similar to *P. latifolium* L. but the leaf sheaths are papillose-hirsute.

Panicum columbianum var. *thinnium* Hitchc. & Chase. Small panic grass. Scarce or overlooked, wet to dry fields, thickets, low to mid-elevations. Collected from Blount and Sevier Counties (Hoffman 1966b).

Panicum commutatum Schultes. Common panic grass. Frequent, thickets, moist to dry woods, low elevations, throughout. (Including *P. commutatum* var. *ashei* (Pears.) Fern.).

Panicum depauperatum Muhl. Panic grass. Occasional, thickets, low to mid-elevations, probably throughout but collected from Blount and Sevier Counties (collections at TENN).

Panicum dichotomiflorum Michx. Large panic grass. Scarce, moist thickets, low to mid-elevations. The collections are from Blount, Sevier, and Haywood Counties.

Panicum dichotomum L. Small panic grass. Occasional, woods and thickets, low elevations, throughout. Several other *Panicum* species are easily confused with *P. dichotomum*: *P. microcarpon* Ashe, *P. sphaerocarpon* Ell., and *P. yadkinense* Ashe.

Panicum lanuginosum Ell. Woolly panic grass. Frequent, moist to dry thickets, roadsides, fields, low to mid-elevations, throughout. Variable; as interpreted here includes *Panicum lanuginosum* var. *fasciculatum* (Torr.) Fern.), *P. lanuginosum* var. *implicatum* (Scribn.) Fern., and *P. lanuginosum* var. *lindheimeri* (Nash) Fern.

Panicum latifolium L. Broad-leaved panic grass. Occasional, dry woods and thickets, low to mid-elevations, probably throughout but collected from Blount and Sevier Counties. Similar to *P. clandestinum* L., but the sheaths not papillose-hirsute.

Panicum laxiflorum Lam. Panic grass. Occasional, dry woods, roadsides, low elevations, throughout.

Panicum longifolium Torr. Long-leaved panic grass. Scarce, wet meadows, low elevations. The collections are from Cades Cove (Blount Co.).

Panicum longiligulatum Nash. Long-ligule panic grass. Rare or overlooked; the single collection is from Russell Field, Blount County (Bruhn and Moore, unnumbered, 1963, at TENN).

Panicum meridionale Ashe. Southern panic grass. Scarce or overlooked, dry woods, thickets, low elevations. Collected from Blount and Sevier Counties. (Included in *P. lanuginosum* L. in R).

POACEAE (Cont.)

Panicum microcarpon Muhl. Small-fruited panic grass. Frequent, dry woods, thickets, low to mid-elevations, throughout. (Included in *P. dichotomum* in R).

**Panicum milaceum* L. Millet. Rare, roadside, low elevation. A single site along Rt. 73 (Sevier Co.) (PSW). Native to the Old World. (Not in R).

Panicum philadelphicum Bernh. Philadelphia panic grass. Occasional, moist open ground, low elevations, throughout.

Panicum polyanthes Schultes. Panic grass. Occasional, dry to moist thickets, low elevations, throughout.

Panicum scoparium Lam. Velvet panic grass. Scarce, wet meadows and thickets, low elevations. Cades Cove (Blount Co.). The culms and leaf sheaths are pilose and often purple-tinged.

Panicum sphaerocarpon Ell. Panic grass. Occasional, moist to dry thickets, low elevations, throughout.

Panicum stipitatum Nash. Stalked-fruit panic grass. Scarce, moist thickets, low elevations. Western GRSM (Blount Co.). The fruits are stalked; this species is similar to *P. anceps*, *P. virgatum* and *P. agrostioides*.

Panicum tuckermanii Fern. Tuckerman's panic grass. Rare or overlooked, moist thickets, roadsides, low to mid-elevations. The collections are from Sevier and Swain Counties. (Not in R). The panicles are not fully exerted from the leaf sheaths--otherwise much resembling *P. philadelphicum* Bernh. The populations need further work to verify this taxon in the park's flora.

Panicum verrucosum Muhl. Tuberculate panic grass. Occasional, wet meadows, thickets, low elevations. The collections are all from western GRSM (Blount Co.). Narrow-leaved, and the spikelets are warty (tuberculate).

Panicum villosissimum Nash. Panic grass. Scarce or overlooked, dry woods, low to mid-elevations. The collections are from Blount County.

Panicum virgatum L. Panic grass. Scarce, fields, low elevations. Lower Abrams Creek (Blount Co.) and near Oconaluftee (Swain Co.).

Panicum yadkinense Ashe. Small panic grass. Scarce or overlooked, dry thickets, low elevations. The collections are from Blount and Haywood Counties. The leaf sheaths are warty (smooth in *P. dichotomum* L.). (Included in *P. dichotomum* L. in R).

Paspalum (Gen. 161)

Paspalum ciliatifolium var. *muhlenbergii* (Nash) Fern. Ciliate paspalum.

Occasional, roadsides, low elevations. The collections are from Cades Cove (Blount County). (In *P. setaceum* Michx. in R).

**Paspalum dilatatum* Poir. Dallis-grass. Occasional, roadsides, low elevations. The collections are from Blount and Swain Counties. Native to the tropics.

Paspalum laeve Michx. var. *laeve*. Smooth paspalum. Occasional, streamsides, roadsides, low elevations, probably throughout, but collected from Blount County. (None of the collections fit the description of *P. laeve* var. *circulare* (Nash) Fern--see Fernald 1950). The leaf sheaths are smooth in *P. laeve* Michx. (pilose in the variety below).

Paspalum laeve var. *pilosum* Scribn. Pilose paspalum. Occasional, roadsides, low elevations, probably throughout but collected from Sevier and Haywood Counties. (Not in R).

POACEAE (Cont.)

Paspalum pubiflorum var. *glabrum* Vasey. *Paspalum*. Occasional, roadsides, low elevations. The collections are from Haywood and Blount Counties. (Included in *P. pubiflorum* Rupr. in R).

**Paspalum urvillei* Steud. Vasey-grass. Occasional, roadsides, low elevations. The collections are from Swain County. Native to the tropics.

Phleum (Gen. 223)

**Phleum pratense* L. Common timothy, herd's grass. Common, roadsides, fields, balds, low to high elevations, throughout. Native to Europe.

Poa (Gen. 378)

Poa alsodes Gray. Wood bluegrass. Frequent, rich moist woods, streamsides, low to high elevations, throughout.

**Poa annua* L. Low speargrass, annual bluegrass. Common, roadsides, lawns, trails, openings, low to high elevations, throughout. Native to Eurasia.

Poa autumnalis Muhl. Autumn bluegrass. Infrequent, woods, low elevations. Western GRSM (Blount Co.).

Poa chapmaniana Schribn. Chapman's bluegrass. Scarce, overlooked, mesic woods, low to high elevations. Collected from Blount and Sevier Counties (TENN).

**Poa compressa* L. Canada bluegrass, wiregrass. Occasional, fields, thickets, balds, low to high elevations. Collected from Blount, Sevier, and Swain Counties. Native to Eurasia.

Poa cuspidata Nutt. Woodland bluegrass. Common, mesic to submesic woods, low to high elevations, throughout.

Poa palustris L. Marsh bluegrass. Rare; known from a single collection: edge of stream, Upper Bunches Creek, Swain County (Blomquist 307 at DUKE).

**Poa pratensis* L. Junegrass, Kentucky bluegrass. Frequent, roadsides, fields, open woods, low to high elevations, throughout. Native to Europe.

Poa saltuensis Fern. & Wieg. Rare; known from "along Rt. 284, one mile below Davenport Gap" (Underwood and Hoffman, unnumbered, 5/17/63, GRSM) and Cataloochee (Haywood Co.--PSW). (Not in R).

Poa sylvestris Gray. Woodland bluegrass. Rare or overlooked, "near Fish Camp Prong, 3000 ft, Sevier County" (Jennison 335, TENN and GRSM), Cataloochee, Haywood County, and White Oak Sink, Blount County. (PSW, GRSM).

Poa trivialis L. Bluegrass. Scarce, wet meadows, low elevations. Cades Cove, Blounty (White 1939 at GRSM).

Sasa (Gen. 414E)

**Sasa palmata* (Milford) E. G. Camus. *Sasa* bamboo. Very rare, persistent after cultivation along a stream just inside GRSM boundary at Gatlinburg (Sevier Co.). Native to E. Asia. (Not in R). (*Arundinaria japonica* Sieb. & Zucc. of Hoffman 1964).

Secale (Gen. 407)

**Secale cereale* L. Rye. Occasional, roadbanks, low elevations. The collections are from Sevier Co. (Not on Hoffman list). Native to Eurasia.

Setaria (Gen. 171)

**Setaria faberi* Herrman. Foxtail. Rare; a recent introduction via roadfill used along Rt. 73 (Sevier Co.) (PSW). Native to E. Asia.

POACEAE (Cont.)

- **Setaria geniculata* (Lam.) Beauv. Bent foxtail. Occasional, roadsides, fields, wet meadows, low elevations, probably throughout but collected from only Blount and Sevier Counties. Native to eastern and midwestern U.S.
- **Setaria glauca* (L.) Beauv. Glaucous foxtail. Apparently rare, roadsides, low elevations. The only collection is from the Sugarlands area (Sevier Co.) (PSW). Native to Eurasia.
- **Setaria viridis* (L.) Beauv. Green foxtail. Apparently rare, fields, low elevations. Collected from: "roadside, Cades Cove," (Berry 11968 at TENN) and Lower Abrams Creek (Blount County). Native to Eurasia.

Sorghastrum (Gen. 134M)

- Sorghastrum elliottii* (Mohr.) Nash. Smaller Indian grass. Scarce; collected only from Cooper Road near Abrams Creek Ranger Station (Blount Co.; TENN).
- Sorghastrum nutans* (L.) Nash. Indian grass. Frequent, dry woods, trailsides, low to mid-elevations, throughout.

Sorghum (Gen. 134J)

- **Sorghum halepense* (L.) Pers. Johnson grass. Infrequent but probably spreading, fields, low elevations. Collected from Lower Abrams Creek, Cades Cove, and along Rt. 73 (Blount and Sevier Cos.). Native to Eurasia.

Sphenopholis (Gen. 271B)

- Sphenopholis nitida* (Biehler) Scribn. Shining sphenopholis. Scarce; collected from Cove Mountain (Cain 514, TENN), Crib Gap (PSW), and White Oak Sink (PSW) (all Blount Co.).
- Sphenopholis obtusata* (Michx.) Scribner. Blunt sphenopholis. Scarce or overlooked; two collections: Norton Creek Road, Sevier County (Rogers 33400, TENN) and Tow String Road, Swain County (DeSelm 1425, TENN).

Sporobolus (Gen. 230)

- **Sporobolus poiretii* (R. & S.) Hitchc. Smutgrass. Occasional, roadsides, lawns, low elevations. Collected only from Swain County. Native to tropical America.

Tridens (Gen. 335)

- Tridens flavus* (L.) Hitchc. Purple top. Frequent, fields, roadsides, low elevations, throughout. (*Triodia flava* (L.) Smyth).

Trisetum (Gen. 271)

- Trisetum pensylvanicum* (L.) Beauv. ex R. & S. Trisetum. Wet rocky areas along streams, low to mid-elevations, probably throughout, but collected from only Blount and Sevier Counties.

POACEAE (Cont.)

Triticum (Gen. 408)

**Triticum aestivum* L. Wheat. Rare, waste places, low elevations. Collected recently near Big Creek Ranger Station (Haywood Co.). Horticultural origin.

Uniola (Gen. 365A)

Uniola latifolia Michx. Broad-leaved spanglegrass. Infrequent, moist woods, low elevations (Blount, Swain Cos.).

Uniola laxa (L.) BSP. Nodding spanglegrass. Infrequent, wet ground, stream-sides, alluvial woods, low elevations. The collections are all from the Cades Cove area (Blount Co.).

Uniola sessiliflora Poir. Sessile-leaved spanglegrass. Rare; known only from a single collection, along Lower Abrams Creek, 900 ft, Blount County (Jennison 853, TENN, GRSM). The sheath is pilose in this species; otherwise it is similar to U. laxa (L.) BSP.

POTAMOGETONACEAE (Fam. 16A)

Potamogeton (Gen. 58)

Potamogeton amplifolius Tuckerm. Broad-leaved pondweed. Very rare, slow water, low elevations. Known in the park only in Lower Abrams Creek, where discovered by Tom Patrick in 1980 (TENN). Sterile specimens of Potamogeton (possibly of additional species) have been collected in the lower Tabcat Creek area (Blount Co.) but could not be determined. Water level is controlled by a TVA lake in this area; more aquatic species may eventually spread into GRSM via TVA waterways).

SPARGANIACEAE (Fam. 15)

Sparganium (Gen. 54)

Sparganium americanum Nutt. Bur-reed. Scarce, marshes and water channels, low elevations, throughout.

Sparganium angustifolium (Engelm.) Morong. Bur-reed. Very rare and possibly extirpated. Known in Tennessee and GRSM only from Rich Mountain Gap area (Blount Co.), where collected by A. J. Sharp in 1949. (Not in R).

TYPHACEAE (Fam. 14)

Typha (Gen. 49)

Typha latifolia L. Cattail. Scarce, marshes, low elevations. Cades Cove (Blount Co.), vicinity of Smokemont (Swain Co.), grassy patch (Swain Co.), Indian Gap Hotel Bridge (Sevier Co.).

XYRIDACEAE (Fam. 26)

Xyris (Gen. 826)

Xyris torta Smith. Yellow-eyed grass. Rare, marshy ditch in pasture, low elevation. Known from one station in Cades Cove (Blount Co.--this is also the only park locale for Campanula aparinoides) (PSW).

DICOTYLEDONEAE

ACANTHACEAE (Fam. 158)

Justicia (Gen. 8094)

Justicia americana (L.) Vahl. Water-willow. Rare, riversides, low elevations. Known only from one site along the Little River, near Townsend; traditionally listed as in the park (Hoffman 1964) but the label data do not resolve this issue.

Ruellia (Gen. 7965)

Ruellia caroliniensis (Walt.) Steud. Carolina ruellia. Infrequent, dry woods, fields, low elevations. Western GRSM (Blount Co.). The petioles are 3 mm or more long in this species.

Ruellia humilis Nutt. Ruellia. Rare, dry woods, fields, low elevations. Two collections from Cades Cove (Blount Co.); Jennison and Greene 4060, Jennison and Wallace 1636. The petioles are 3 mm or less long in this species. This taxon needs further documentation in the park's flora--it has not been collected since 1937 and the herbarium material is not complete enough for full description.

ACERACEAE (Fam. 102)

Acer (Gen. 4720)

Acer negundo L. Box-elder. Frequent, floodplains and disturbed places, low elevations.

Acer pensylvanicum L. Striped maple or moosewood. Common throughout, in woods and thickets.

**Acer platanoides* L. Norway maple. Rare, persistent at an old building site in the Greenbrier area. (Not in R).

Acer rubrum L. var. *rubrum*. Red maple. Common, mesic to xeric woods, riversides, swamps, throughout.

Acer rubrum var. *trilobum* K. Koch. Trident maple. Infrequent, lower elevations in the Cades Cove area. A variety with small, dominantly three-lobed leaves.

Acer saccharum Marsh. Sugar maple. Common in cove hardwood and northern hardwood forest types. (*Acer saccharum* var. *nigrum* (Michx. f.) Desmarais based on Pittillo 5491 at Western Carolina University herbarium, has hairy leaves but lacks other characteristics of that taxon and so is placed here). An additional subspecific taxon is:

Acer saccharum f. *rugelii* (Pax) Palmer & Steyerl. Occasional, mesic woods. This taxon has three-lobed, almost untoothed leaves.

Acer spicatum Lam. Mountain maple. Common at higher elevations in northern hardwoods and spruce-fir.

In addition to the species listed above, *Acer saccharinum* L. has been found just outside park borders, as a cultivated tree; it is also a native tree in alluvial woods near the park.

AIZOACEAE (Fam. 59)

Mollugo (Gen. 2387)

- **Mollugo verticillata* L. Carpet-weed. Frequent weed along roadsides and sidewalks, and in lawns, low elevations. Introduced from tropical America.

AMARANTHACEAE (Fam. 56)

Amaranthus (Gen. 2299)

- **Amaranthus albus* L. White amaranthus. Rare, roadside near Sugarlands (Sevier Co.) (PSW). Semicosmopolitan weed of unknown origin. (Not in R). (Rogers and Bowers (1973) discussed Tennessee records).
- **Amaranthus hybridus* L. Amaranthus. Scarce, old fields, pastures, low elevations. Semicosmopolitan weed of unknown origin.
- **Amaranthus retroflexus* L. Green amaranth. Rare, roadside near Sugarlands (Sevier Co.) (PSW). Semicosmopolitan weed of unknown origin.
- **Amaranthus spinosus* L. Spiny amaranthus. Infrequent, pastures, old fields, roadsides, low elevations. Semicosmopolitan weed of unknown origin.

ANACARDIACEAE (Fam. 97)

Rhus (Gen. 4594)

- Rhus copallina* L. Shining or winged sumac. Common, dry open woods, old fields, thickets, roadsides, low to mid-elevations, throughout. Plants with leaflets rounded rather than attenuate at the tip have been treated as *Rhus copallina* var. *latifolia* Engler. (Included in *R. copallina* L. in R).
- Rhus glabra* L. Smooth sumac. Common, old fields, woods borders, thickets, roadsides, low to mid-elevations, throughout.
- Rhus radicans* L. Poison ivy. Common, old fields, woods, thickets, roadsides, low to mid-elevations, throughout.
- Rhus typhina* L. Staghorn sumac. Frequent, old fields, roadsides, low to mid-elevations.

ANNONACEAE (Fam. 69)

Asimina (Gen. 2673)

- Asimina triloba* (L.) Dunal. Paw-paw. Occasional, woods and thickets, low elevations.

APIACEAE (Umbelliferae; Fam. 129)

Aegopodium (Gen. 6034)

- **Aegopodium podagraria* L. Old man's beard. Rare, spreading vegetatively and persistent after cultivation, low elevation, Elkmont (Sevier Co.) (PSW). (See Rogers and Underwood 1966).

APIACEAE (Cont.)

Angelica (Gen. 6082)

Angelica triquinata Michx. Filmy angelica. Common, moist woods and thickets, high elevations, throughout.

Angelica venenosa (Greenway) Fern. Hairy angelica. Common, submesic to subxeric woods, low to mid-elevations, throughout.

Chaerophyllum (Gen. 5935)

Chaerophyllum tainturieri var. *floridanum* C. & R. Wild Cervil. Occasional, fields, roadsides, low elevations, probably throughout but collected from Blount and Sevier Counties.

Cicuta (Gen. 6011)

Cicuta maculata L. Spotted cowbane. Scarce, marshes, wet thickets, low elevations. Collected only from Cades Cove (Blount Co.) but to be expected in wet habitats throughout.

Cryptotaenia (Gen. 6015)

Cryptotaenia canadensis (L.) DC. Honewort. Frequent, moist woods and thickets, low to mid-elevations, throughout.

Daucus (Gen. 6142)

**Daucus carota* L. Queen Anne's lace, wild carrot. Common, roadsides, old fields, disturbed areas, throughout. Native to Europe.

Eryngium (Gen. 5923)

Eryngium yuccifolium Michx. Rattlesnake-master. Rare, limestone outcrop in submesic woods, low elevations. Collected from White Oak Sink (Blount Co.) (PSW). Hoffman's (1966b) record was from outside the park.

Heracleum (Gen. 6122)

Heracleum maximum Bartr. Masterwort. Scarce, mesic thickets, high elevations, probably throughout but the collections are from Blount County only (*H. lanatum* Micx. in R).

Hydrocotyle (Gen. 5893)

Hydrocotyle americana L. Water penny-wort. Very rare, known from a single site on Deep Creek (Swain Co.), just inside the GRSM boundary (PSW).

**Hydrocotyle sibthorpioides* Lam. Lawn water-pennywort. Rare, moist lawns. Known only from Sugarlands area (Sevier Co.) (PSW). Native to Asia and Africa.

Ligusticum (Gen. 6071)

Ligusticum canadense (L.) Britt. Loveage. Occasional, submesic woods, low to mid-elevations, throughout.

APIACEAE (Cont.)

Osmorhiza (Gen. 5941)

Osmorhiza claytonii (Michx.) C. B. Clarke. Sweet cicely. Common, mesic to submesic woods, low to mid-elevations, throughout.

Osmorhiza longistylis (Torr.) DC. Long-styled anise-root. Frequent, rich, moist woods, low to mid-elevations throughout (Hoffman 1966b).

Oxypolis (Gen. 6107A)

Oxypolis rigidior (L.) Raf. Cowbane. Frequent, marshes, seeps, streamsides, low to mid-elevations, throughout.

Pastinaca (Gen. 6120)

**Pastinaca sativa* L. Parsnip. Rare, roadside near Sugarlands (Sevier Co.) (PSW). Native to Europe.

Sanicula (Gen. 5918)

Sanicula canadensis L. Canada black snakeroot. Common, mesic to submesic woods, thickets, low to mid-elevations, throughout.

Sanicula gregaria Bickn. Sanicle, black snakeroot. Frequent, rich woods, low to mid-elevations, throughout.

Sanicula marilandica L. Black snakeroot. Occasional, mesic woods, low to high elevations, throughout.

Sanicula smallii Bickn. Small's black snakeroot. The two collections determined as this taxon are from western GRSM (Blount Co., specimens at TENN). (Not on Hoffman's list).

Sanicula trifoliata Bickn. Trifoliate black snakeroot. Occasional, mesic to submesic woods, low to mid-elevations, throughout.

Taenidia (Gen. 6031)

Taenidia integerrima (L.) Drude. Yellow pimpernel. Infrequent, dry hardwood stands, low elevations. Collected from Blount and Sevier Counties. The leaflets are entire and so distinctive for this family in our flora.

Thaspium (Gen. 6076)

Thaspium barbinode (Michx.) Nutt. Meadow-parship. Frequent, mesic to submesic woods, low to mid-elevations, throughout.

Thaspium pinnatifidum (Buckley) Gray. Cut-leaved meadow-parship. Rare, known from a single collection: "Hillside, Swain Co., N. C., 2000 ft", 8/1/1891, Beardslee and Kofoed, unnumbered, at the Gray Herbarium.

Thaspium trifoliatum (L.) Gray var. *trifoliatum*. Purple meadow-parship. Frequent, mesic to submesic woods, low to mid-elevations, throughout. The flowers are maroon.

Thaspium trifoliatum var. *flavum* Blake. Yellow meadow-parship. Frequent, with the typical variety (see above). The flowers are yellow. Several collections determined as *Zizia aurea* (L.) W. D. J. Koch were this taxon (see key below).

APIACEAE (Cont.)

Torilis (Gen. 5945)

**Torilis japonica* (Houtt) DC. Hedge-parsley. Rare introduction, low elevations. Known only from near the mouth of Abrams Creek, Blount County (Sharp 17948 at GRSM). Native to Eurasia. (*T. arvensis* (Hudson) Link. in R).

Zizia (Gen. 6008)

Zizia aptera (Gray) Fern. Golden Alexanders. Occasional, mesic to submesic, rocky woods, low to mid-elevations, throughout.

Zizia trifoliata (Michx.) Fern. Three-leaved golden Alexanders. Occasional, mesic to submesic woods, low to mid-elevations, throughout.

A key to *Zizia* and *Thaspium* (adapted from Radford et al. 1968 and Fernald 1950) is given below; they are frequently confused in the field. *Z. aurea* (L.) W. D. Koch has not yet been collected from GRSM and so is shown in parentheses.

Central flower and fruit sessile or nearly so; fruits ribbed only (*Zizia*).

Basal leaves, or some of them, simple, cordate-ovate..... *Zizia aptera*

Basal leaves compound

Leaflets thick, crenate-serrate, 2-4 teeth/cm..... *Zizia trifoliata*

Leaflets thin, finely serrate, 5/10 teeth/cm..... (*Zizia aurea*)

Central flower and fruit distinctly stalked; fruits winged (*Thaspium*).

Basal leaves simple or once-ternate..... *Thaspium trifoliatum*

Petals maroon..... *T. trifoliatum* var. *trifoliatum*

Petals yellow..... *T. trifoliatum* var. *flavum*

Basal leaves twice or more ternately divided

Ovary and fruit glabrous, petals yellow; leaf segments ovate to lanceolate..... *Thaspium barbinode*

Ovary and fruit hairy, petals white; leaf segments linear *Thaspium pinnatifidum*

APOCYNACEAE (Fam. 144)

Amsonia (Gen. 6591)

Amsonia tabernaemontana Walt. Willow amsonia. Rare, moist woods, mostly at low elevations; three locales (Blount, Sevier Cos.).

APOCYNACEAE (Cont.)

Apocynum (Gen. 6684)

Apocynum androsaemifolium L. Spreading dogbane. Scarce, roadsides, low elevations. Collected from Sevier County (PSW).

Apocynum cannabinum L. Dogbane. Scarce, roadsides, low elevations. Collected from Sevier County (PSW).

Vinca (Gen. 6598)

**Vinca minor* L. Periwinkle. Occasional, persistent and spreading at old homesites and cemeteries, mostly at low elevations. Native to Europe.

AQUIFOLIACEAE (Fam. 99)

Ilex (Gen. 4614)

Ilex beadlei Ashe. Beadle's holly. Occasional, submesic woods, low to mid-elevations, especially in the Lower Abrams Creek area (Blount, Sevier, Swain Cos.) (*I. montana* var. *mollis* (Gray) Britt.).

Ilex collina Alex. Appalachian holly. Rare, presently known only from a single locale: thicket on disturbed ground along the trail from Clingmans Dome parking area to Andrews Bald, ca 6,100 ft (Swain Co.). To be looked for on the Tennessee side--if found there, it would be a state record. (*Nemopanthus collinus* (Alex.) Clark; *Ilex longipes* Chapm. of Hoffman 1964; *Ilex ambigua* var. *longipes* (Chapm.) Ahles in R).

Ilex montana T. & G. Mountain-holly. Common, mesic to subxeric woods, low to high elevations, throughout. (*I. ambigua* var. *montana* (T. & G.) Ahles in R).

Ilex opaca Ait. American holly. Frequent, mesic to submesic woods, low to mid-elevations, throughout.

Ilex verticillata (L.) Gray. Winterberry. Rare, streamsides, low elevations. Known only from Lower Abrams Creek (Blount Co.) (PSW). An older collection at TENN (Sharp and Veloir 20993) turns out to be this species (also from Lower Abrams Creek).

ARALIACEAE (Fam. 128)

Aralia (Gen. 5881)

Aralia nudicaulis L. Wild sarsaparilla. Frequent, mid- to upper elevation woods, throughout.

Aralia racemosa L. Wild spikenard. Frequent in rich, moist woods, throughout.

Aralia spinosa L. Devil's walking stick. Frequent in disturbed areas, old fields, roadsides, and occasional in forest gaps, low to mid-elevations, throughout.

Hedera (Gen. 5855)

**Hedera helix* L. English ivy. Infrequent escape, old homesites, low elevations. Native to Europe.

ARALIACEAE (Cont.)

Panax (Gen. 5883)

Panax quinquefolium L. Ginseng. Occasional in rich, moist cove hardwoods, throughout.

Panax trifolium L. Dwarf ginseng. Scattered populations, cove hardwoods, mid-elevations.

ARISTOLOCHIACEAE (Fam. 53)

Aristolochia (Gen. 2174)

Aristolochia durior Hill. Dutchman's pipe. Common in cove hardwoods, sometimes forming dense patches after disturbance, low to mid-elevations. (*A. macrophylla* Lam. in R).

Aristolochia serpentaria L. Snakeroot. Scarce, in rocky woods at low elevations (Blount and Sevier Cos.)

Asarum (Gen. 2170)

Asarum canadense L. Wild ginger. Common, rich, moist, often rocky woods, low to mid-elevations. Plants with acuminate calyx lobes are more common than plants with truncate lobes; the former have been segregated as *Asarum canadense* var. *acuminatum* Ashe. At least superficially, then, our populations appear genetically distinct from Northern populations.

Hexastylis (Gen. 2170A)

Hexastylis arifolia (Michx.) Small. Little brown jugs. Frequent, mesic woods, often dominated by hemlock, low to mid-elevations. (*Asarum ruthii* Ashe).

Hexastylis shuttleworthii (Britt. & Baker) Small. Spotted little brown jugs. Scarce, streamside woods, low elevations, Lower Abrams Creek area only (Blount Co.). (*Asarum shuttleworthii* Britt. & Baker).

ASCLEPIADACEAE (Fam. 145)

Asclepias (Gen. 6791)

Asclepias amplexicaulis Sm. Blunt-leaved milkweed. Scarce, dry woods and thickets, low to mid-elevations. Our only collection is from Blount County.

Asclepias exaltata L. Poke milkweed. Frequent, mesic to submesic woods, thickets, balds, low to mid-elevations, throughout.

Asclepias incarnata var. *pulchra* (Willd.) Pers. Swamp milkweed. Scarce, wet ground, low elevations. Known from western GRSM (Blount Co.). (*A. incarnata* ssp. *pulchra* (Willd.) Woodson in R).

Asclepias quadrifolia Jacq. Four-leaved milkweed. Occasional, submesic to subxeric woods and thickets, low to mid-elevations, throughout.

**Asclepias syriaca* L. Common milkweed. Rare, roadsides, low elevations. Collected from Sevier Co. only (PSW). Probably native to midwestern U.S.

ASCLEPIADACEAE (Cont.)

- Asclepias tuberosa* L. Butterfly-weed. Occasional, dry woods and thickets, low to mid-elevations, throughout.
- Asclepias variegata* L. White milkweed. Occasional, mesic to subxeric woods, thickets, low to mid-elevations, probably throughout but collected from Blount and Sevier Counties.
- Asclepias verticillata* L. Whorled milkweed. Scarce, dry woods, low to mid-elevations. Two collections: Cades Cove (Blount Co.) and Dalton Gap (Swain Co.).

Matelea (Gen. 6930)

- Matelea gonocarpa* (Walter) Shinnars. Climbing milkweed. Rare, partially shaded limestone outcrop, low elevations. Known from a single site in Cades Cove (Blount Co.) (PSW). The specimens are sterile; hence the specific determination is tentative.

ASTERACEAE (Compositae; Fam. 168)

Achillea (Gen. 9332)

- **Achillea millefolium* L. Yarrow. Frequent, roadsides, fields, disturbed places, low to high elevations, throughout. Native to Europe.

Actinomeris (Gen. 9215)

- Actinomeris alternifolia* (L.) DC. Wingstem. Occasional, dry woods, thickets, low elevations. The collections are from western GRSM (Blount Co.). (*Verbesina alternifolia* (L.) Britt. ex Kearney in R).

Ambrosia (Gen. 9146)

- Ambrosia artemisiifolia* L. Common ragweed. Common, roadsides, old fields, low to high elevations, throughout. (Including *Ambrosia artemisiifolia* var. *elator* (L.) Descourtils of Hoffman's list).
- Ambrosia trifida* L. Giant ragweed. Occasional, fields, roadsides, low elevations, probably throughout but collected from Blount and Swain Counties.

Antennaria (Gen. 8978)

- Antennaria neglecta* Greene. Pussy toes. Occasional, dry woods, roadside banks, low elevations, throughout. (Not in R). Basal leaves ca 1.5 cm or less wide, 1-nerved or obscurely 3-nerved.
- Antennaria plantaginifolia* (L.) Richardson. Plantain-leaved pussy toes. Occasional, dry woods, roadside banks, trailsides, low to mid-elevations, throughout. Basal leaves definitely 3-nerved, heads several.
- Antennaria solitaria* Rydb. Pussy toes. Occasional, dry woods, roadside banks, low elevations, throughout. (Not in R). Heads solitary.

Anthemis (Gen. 9330)

- **Anthemis arvensis* L. Corn-chamomile. Currently known from roadside near Hoglen Gap (Haywood Co.) and Cades Cove (Blount Co.) (PSW). Native of Europe.

ASTERACEAE (Cont.)

- **Anthemis cotula* L. Mayweed. Scarce, old fields, roadsides, low to mid-elevations. Collected from Cades Cove (Blount Co.) and Elkmont (Sevier Co.). Native to Europe.

Arctium (Gen. 9452)

- **Arctium minus* (Hill) Bernh. Burdock. Occasional, roadsides, old fields, low elevations, throughout. Native to Europe.

Artemisia (Gen. 9358)

- **Artemisia ludoviciana* var. *mexicana* (Willd.) Fern. White sage. Scarce, roadsides, low elevations. Collected from Sevier County. Ranges from Mexico to S. Mo. (Not in R).
 **Artemisia vulgaris* L. Common mugwort. Rare, roadside, low elevation. Known from only one collection: along Rt. 129 (Blount Co.) (PSW). Native to Europe.

Aster (Gen. 8900)

- Aster acuminatus* Michx. Whorled wood aster. Common, moist woods, mid- to high elevations, throughout.
Aster chlorolepis Burgess. Mountain wood aster. Frequent, mesic woods, high elevations, throughout. (*A. divaricatus* var. *chlorolepis* (Burgess) Ahles in R.). Similar to *A. divaricatus* L. but heads larger:
 Involucre 7-10 mm high, 8-10 mm broad; rays 10 or more,
 1.5-2 cm long *A. chlorolepis*.
 Involucre 5-8 mm high, 3-7 mm broad; rays 5-10,
 rarely 12, 1-1.5 cm long *A. divaricatus*.
Aster cordifolius L. Heart-leaved aster. Common, thickets, roadsides, low to high elevations, throughout. Variable--this and *A. lowrieanus* Porter and *A. saggitifolius* Wedemeyer ex Willd. are easily confused in the park.
Aster curtisii T. & G. Curtis' aster. Common and variable, submesic to subxeric woods, low to high elevations, throughout.
Aster divaricatus L. White wood Aster. Common, mesic to submesic woods, low to mid-elevations, throughout. See *A. chlorolepis* Burgess above.
Aster dumosus L. Bushy aster. Frequent, fields, roadsides, low elevations. The collections are all from Blount Co.
Aster infirmus Michx. Entire-leaved aster. Frequent, dry woods, low to mid-elevations, throughout.
Aster lateriflorus (L.) Britt. Calico aster. Common, mesic to submesic woods, thickets, trailsides, roadsides, low to high elevations, throughout.
Aster linariifolius L. Stiff aster. Frequent, dry woods, low elevations, throughout.
Aster lowrieanus Porter. Lowry's aster. Among collections of heart-leaved asters are specimens which fit this taxon; however, the group is variable and in need of thorough systematic work. Distribution and habitat as in *A. cordifolius* L. (Included in *A. cordifolius* L. in R.).
Aster macrophyllus L. Big-leaved aster. Occasional, submesic woods, low to high elevations, throughout. Including *Aster macrophyllus* var. *ianthinus* (Burgess) Fern. of the Hoffman list.

ASTERACEAE (Cont.)

- Aster oblongifolius* Nutt. Aromatic aster. Rare, dry woods, bluffs, roadsides, low elevations. Lower Abrams Creek area (Blount Co.).
- Aster patens* Ait. Late purple aster. Frequent, dry woods, low to mid-elevations, throughout.
- Aster phlogifolius* Muhl. Thin-leaved aster. Frequent, dry woods, low to mid-elevations, throughout. The leaves are constricted above the clasping base. (See Jones 1981). (*A. patens* var. *phlogifolius* (Muhl.) Nees.; included in *A. patens* Ait. in R.).
- Aster pilosus* Willd. Downy aster. Common, fields, roadsides, thickets, low elevations, throughout. (Including *A. pilosus* var. *platyphyllus* (T. & G.) Blake of Hoffman's list).
- Aster puniceus* L. Purple-stemmed aster. Frequent, moist thickets, streamsides, low to high elevations, throughout. *A. prenanthoides* Muhl. is similar but the leaves are acuminate, abruptly contracted below the base to a winged petiole. It has not been collected in GRSM.
- Aster sagittifolius* Wedemeyer ex Willd. Arrow-leaved aster. Only one collection fits this taxon: Sharp and Veloira 20989 (TENN), "Abrams Creek along road just inside Park, ca 900 ft" (Blount Co.). Other collections determined as this species are more straightforwardly placed in *A. cordifolius* L. There is much confusion in the *A. cordifolius* - *lowriensis* - *sagittifolius* group in the park; monographic work is needed.
- Aster surculosus* Michx. Recurved aster. Common, dry woods, thickets, low to mid-elevations, throughout.
- Aster umbellatus* Mill. Tall white aster. Scarce, thickets, old fields, open ground, low to high elevations (Blount, Swain Cos.).
- Aster undulatus* L. Wavy-leaved aster. Common, submesic to subxeric woods, low to mid-elevations, throughout. (Including *A. sylvestris* Burgess of Hoffman 1964; also including *Aster undulatus* var. *loriformis* Burgess of Hoffman's list).

Bidens (Gen. 9237)

- Bidens bipinnata* L. Spanish-needles. Occasional, roadsides, old fields, low elevations, probably throughout (collected from Blount and Sevier Cos.).
- Bidens cernua* L. Stick-tight. Scarce, marshes, streamsides, low elevations, known only from Cades Cove and Lower Abrams Creek (Blount Co.) (PSW).
- Bidens frondosa* L. Beggar-ticks. Occasional, roadsides, old fields, streamsides, wet ground, low to mid-elevations, probably throughout (collected from Blount and Swain Cos.).

Cacalia (Gen. 9409)

- Cacalia atriplicifolia* L. Pale Indian-plantain. Frequent, mesic to submesic woods, thickets, low to high elevations, throughout.
- Cacalia muhlenbergii* (Sch.-Bip.) Fern. Great Indian-plantain. Occasional, mesic woods, thickets, low elevations, probably throughout (collected from Blount and Haywood Cos.).
- Cacalia rugelia* (Shuttl. ex Chapm.) Barkley & Cronq. Rugel's ragwort. Occasional, mesic woods, high elevations. Endemic to the Great Smoky Mountains. (*Senecio rugelia* Gray).

ASTERACEAE (Cont.)

Centaurea (Gen. 9476)

- **Centaurea cyanus* L. Batchelor's button. Rare, persistent after cultivation, low elevations. Known from one site (Sevier Co.). Native to Europe.

Chrysanthemum (Gen. 9341)

- **Chrysanthemum leucanthemum* var. *pinnatifidum* Lecoq & Lamotte. Daisy. Common, roadsides, fields, balds, low to high elevations, throughout. Native to Europe. (Included in *C. leucanthemum* L. in R.)

Chrysopsis (Gen. 8844)

- Chrysopsis mariana* (L.) Ell. Golden aster. Frequent, dry woods, low to mid-elevations, throughout. (*Heterotheca mariana* (L.) Shinnery in R).
Chrysopsis nervosa (Willd.) Fern. Silkgrass. Frequent, dry woods, low to mid-elevations, throughout. (*Heterotheca nervosa* (Willd.) Shinnery in R).

Cichorium (Gen. 9553)

- **Cichorium intybus* L. Chickory. Occasional, roadsides, fields, low elevations, throughout. Native to Europe.

Cirsium (Gen. 9462)

- Cirsium altissimum* (L.) Spreng. Tall thistle. Occasional, young woods, thickets, low to mid-elevations, throughout. (*Carduus altissimus* L. in R).
 **Cirsium arvense* (L.) Scop. Canada thistle. Infrequent, roadsides, fields, low to mid-elevations, probably throughout but collected from Swain County only. Native to Europe. (*Carduus arvensis* (L.) Robson in R).
Cirsium discolor (Muhl. ex Willd.) Spreng. Thistle. Rare, woods and thickets, low elevations. Collected from Cades Cove (Blount Co.) only (PSW). (*Carduus discolor* (Muhl. ex Willd.) Nutt. in R).
Cirsium muticum Michx. Swamp thistle. Occasional, mesic streamside woods, thickets, low to mid-elevations, throughout. (*Carduus muticus* (Michx.) Pers. in R).
 **Cirsium vulgare* (Savi) Tenore. Bull thistle. Infrequent, fields, roadsides, low elevations. Collected from Haywood and Blount Counties. Native to Europe. (*Carduus lanceolatus* L. in R).

Coreopsis (Gen. 9227)

- Coreopsis auriculata* L. Auricled tickseed. Rare, dry woods, low elevations. Collected "near Gatlinburg" (Sevier Co.; Jennison 1209 at GRSM).
Coreopsis major Walt. Wood tickseed. Common, dry woods, low to mid-elevations, throughout. Smooth plants have been segregated as *Coreopsis major* var. *stellata* (Nutt.) Robins, and this form predominates in GRSM.
Coreopsis pubescens Ell. Hairy tickseed. Infrequent, roadside thickets, low to high elevations. Collected from Blount, Haywood, and Swain Counties.
 **Coreopsis tinctoria* Nutt. Garden. Coreopsis. Scarce, dry fields, low elevations. Collected from Cades Cove (Blount Co.). Native to Minnesota and westward.

ASTERACEAE (Cont.)

Coreopsis tripteris L. Tall tickseed. Scarce, dry woods, low elevations, Lower Abrams Creek area, White Oak Sink (Blount Co. and Swain Co.).

Crepis (Gen. 9605)

**Crepis capillaris* (L.) Wallr. Hawk's beard. Rare, roadside, low elevation. A single collection, Cataloochee area (Haywood Co.; Jennison and Fleetwood 1942). (*C. tectorum* L. of Hoffman's list)

Elephantopus (Gen. 8775)

Elephantopus carolinianus Willd. Carolina tobaccoweed. Frequent, old fields, thickets, submesic young woods, low to mid-elevations, throughout. Leaves distributed on stem.

Elephantopus tomentosus L. Hairy tobaccoweed. Occasional, old fields, thickets, dry woods, low to mid-elevations, throughout. Leaves mostly basal.

Erechtites (Gen. 9389)

Erechtites hieracifolia var. *intermedia* Fern. Pilewort. Occasional, Disturbed ground, low to mid-elevations, probably throughout (the collections are from Blount Co.). (Not in R).

Erigeron (Gen. 8901)

Erigeron annuus (L.) Pers. Daisy-fleabane. Occasional, roadsides, old fields, low elevations, probably throughout (collected from Blount and Swain Cos.)

Erigeron canadensis L. Horse-weed. Occasional, roadsides, old fields, low to high elevations, throughout.

Erigeron philadelphicus L. Philadelphia fleabane. Apparently less common than *E. pulchellus* Michx.; one collection (Elkmont, Sevier Co., Jennison 122).

Erigeron pulchellus Michx. Robin's-plantain. Frequent, mesic woods, thickets, low elevations, throughout.

Erigeron strigosus Muhl. ex Willd. Daisy-fleabane. Occasional, roadsides, fields, low elevations, probably throughout (collected from Blount and Swain Cos.).

Eupatorium (Gen. 8816)

Eupatorium album L. White eupatorium. Frequent, dry woods, low to mid-elevations, throughout.

Eupatorium aromaticum L. Aromatic snakeroot. Occasional, dry woods, low to mid-elevations, probably throughout but collected from Sevier and Swain Counties.

Eupatorium capillifolium (Lam.) Small. Dog-fennel. Rare, dry woods, low elevations. Known only from Lower Abrams Creek area (Blount Co.) (PSW).

Eupatorium coelestinum L. Mistflower. Occasional, moist thickets, roadsides, low to mid-elevations, probably throughout but collected from Sevier County only.

ASTERACEAE (Cont.)

- Eupatorium fistulosum* Barratt. Joe-Pye-weed. Occasional, wet thickets, streamsides, roadsides. Collections are from high elevations (TENN). The stem is hollow (solid in *E. maculatum* L.).
- Eupatorium hyssopifolium* L. Narrow-leaved snakeroot. Scarce, dry woods, low elevations. Lower Abrams Creek (Blount Co.; Sharp S-304 at GRSM).
- Eupatorium maculatum* L. Joe-Pye-weed. Frequent, wet thickets, streamsides, roadsides, old fields, low to high elevations, throughout. The stem is solid (hollow in *E. fistulosum* Barratt).
- Eupatorium perfoliatum* L. Boneset. Occasional, marshes and seeps, low to mid-elevations, scattered throughout.
- Eupatorium purpureum* L. Sweet or woodland Joe-Pye-weed. Common, submesic to subxeric woods, low to mid-elevations, throughout. Variable--taller, more robust, and narrower-leaved when growing in open areas.
- Eupatorium rotundifolium* L. Round-leaved snakeroot. Occasional, dry woods, low elevations, probably throughout but collected from Sevier and Swain Counties.
- Eupatorium rugosum* Houtt. White snakeroot. Common, moist wood and thickets, low to high elevations, throughout. Plants with 12-25 flowers per head are the typical variety; plants with up to 34 flowers per head have been segregated as *Eupatorium rugosum* var. *roanense* (Small.) Fern. (Included in *E. rugosum* Houtt. in R).
- Eupatorium serotinum* Michx. Acuminate-leaved snakeroot. Occasional, dry woods, low elevations. Collected from western GRSM (Blount Co.).
- Eupatorium sessilifolium* L. Upland boneset. Scarce, dry woods, low elevations. Lower Abrams Creek area (Blount Co.).

Galinsoga (Gen. 9246)

- **Galinsoga quadriradiata* Ruiz. & Pavon. Infrequent, roadsides, low to high elevations, scattered throughout. Native to trop. Am. (*G. ciliata* (Raf.) Blake of Hoffman's list).

Gnaphalium (Gen. 8992)

- Gnaphalium helleri* Britt. Glandular catfoot. Occasional, dry woods, low to mid-elevations, probably throughout but collected from Blount and Swain Counties. The stem is glandular-hairy (thinly white woolly in *G. obtusifolium* L.). Not on Hoffman's list (*G. obtusifolium* var. *micradenium* Weath.; included in *G. obtusifolium* L. in R).
- Gnaphalium obtusifolium* L. Catfoot. Occasional, dry woods, roadbanks, low to mid-elevations, probably throughout but collected from Sevier County. See notes under *G. helleri* Britt. above. (Including *G. obtusifolium* var. *praecox* Fern.).
- Gnaphalium purpureum* L. Purple cudweed. Occasional, roadbanks, lawns, low elevations to mid-elevations, throughout.

Helenium (Gen. 9305)

- Helenium autumnale* L. Autumn sneezeweed. Occasional, fields, roadsides, moist to dry soil, low to mid-elevations, throughout.
- Helenium flexuosum* Raf. Dark-eyed sneezeweed. Infrequent, fields, roadsides, low elevations. Collected from Blount and Sevier Counties (*H. nudiflorum* Nutt. of Hoffman's list).

ASTERACEAE (Cont.)

Helianthus (Gen. 9200)

- Helianthus angustifolius* L. Narrow-leaved sunflower. Rare, wet meadows, low elevations. Cades Cove only (Blount Co.).
- Helianthus atrorubens* L. Sunflower. Frequent, dry woods, low to mid-elevations, throughout.
- Helianthus decapetalus* L. Wide-leaved sunflower. Frequent, dry woods, low to high elevations, throughout.
- Helianthus divaricatus* L. Sessile-leaved sunflower. Occasional; the collections are from Lower Abrams Creek (Blount Co., at GRSM) and Andrews Bald (Swain Co., at TENN).
- Helianthus glaucophyllus* D. M. Smith. Glaucous sunflower. Scarce, submesic woods and thickets, mid-elevations. Known only from the North Carolina side of the park (Haywood and Swain Cos.). (Hoffman 1966b).
- Helianthus microcephalus* T. & G. Small wood sunflower. Frequent, dry woods, low to mid-elevations, throughout.

Heliopsis (Gen. 9157)

- Heliopsis helianthoides* (L.) BSP. Ox-eye. Occasional, moist woods, thickets, low elevations. Collected from Blount, Sevier, and Swain Counties.

Hieracium (Gen. 9607)

- **Hieracium aurantiacum* L. Orange hawkweed. Rare, roadsides, fields. Known from a single collection at DUKE (Haywood Co.). Native to Europe.
- **Hieracium florentinum* All. King devil. Scarce, roadsides, low to mid-elevations. Collected from Haywood County only (PSW). Native to Europe.
- Hieracium gronovii* L. Hairy hawkweed. Frequent, dry woods and roadsides, low to mid-elevations, throughout. (See *H. scabrum* Michx. below).
- Hieracium paniculatum* L. Panicled hawkweed. Common, dry woods, low to mid-elevations, throughout.
- **Hieracium pilosella* L. Mouse-ear hawkweed. Occasional, roadsides. The collections are from mid- to high elevations. Native to Europe.
- **Hieracium pratense* Tausch. Field hawkweed. Infrequent, roadsides, low to mid-elevations. Collected from Sevier and Haywood Counties (PSW). Native to Europe.
- Hieracium scabrum* Michx. Rough hawkweed. Occasional, but probably often confused with *H. gronovii* L. The two collections are from Swain County, mid- to high elevations (Jennison 3446, 1204 at GRSM). The upper stem is densely stipitate-glandular (not glandular or with only a few glandular hairs in *H. gronovii* L.).
- Hieracium venosum* L. Rattlesnake hawkweed. Common, dry woods, roadbanks, low to mid-elevations, throughout.

Hypochoeris (Gen. 9572)

- **Hypochoeris radicata* L. Cat's ear. Rare. Known from near the Laurel Falls trail entrance (Sevier Co.) and Swain Co. Native to Europe. The Sevier Co. station was the first discovery of this plant in Tennessee (Rogers and Bowers (1969)).

ASTERACEAE (Cont.)

Krigia (Gen. 9560)

- Krigia biflora* (Walt.) Blake. Dwarf dandelion. Occasional, open ground, balds, streamsides, low to high elevations, probably throughout but collected from Blount and Sevier Counties.
- Krigia dandelion* (L.) Nuttall. Dwarf dandelion. Scarce or overlooked, fields, low elevations (Blount Co.) (PSW).
- Krigia montana* (Michx.) Nutt. Mountain krigia. Scarce, seepage areas, wet cliffs, high elevations. Collected from Mt. LeConte (Sevier Co.). No other Tennessee collections have come to my attention.
- Krigia virginica* (L.) Willd. Virginia dwarf dandelion. Occasional, fields, low to mid-elevations, probably throughout but collected from Blount and Sevier Counties.

Kuhnia (Gen. 8825)

- Kuhnia eupatorioides* L. False boneset. Rare, roadsides, dry woods, low elevations. Lower Abrams Creek and White Oak Sink (Blount Co.).

Lactuca (Gen. 9596)

- Lactuca biennis* (Moench) Fern. Tall blue lettuce. Frequent, moist thickets, low elevations, probably throughout but collected only from Swain County. The pappus is light brown (white in the similar *L. floridana* (L.) Gaertn.
- Lactuca canadensis* L. Wild lettuce. Frequent, moist thickets, roadsides, low to mid-elevations, throughout. Very variable in leaf.
- Lactuca floridana* Gaertn. Woodland blue lettuce. Occasional, moist woods, low elevations. The collections are from western GRSM (Blount Co.). The pappus is white (light brown in *L. biennis* (Moench.) Fern.). Including *Lactuca floridana* var. *villosa* (Jacq.) Cronq. of Hoffman's list.
- **Lactuca serriola* L. Prickly lettuce. Occasional, roadsides, low elevations, probably throughout but collected from Blount and Sevier Counties. Native to Europe. (*L. scariola* L.).

Lapsana (Gen. 9555)

- **Lapsana communis* L. Nipplewort. Rare, a single collection: Davidson Gap, 3,500 ft, Haywood County (Jennison and Fleetwood 1943). Native to Europe.

Liatris (Gen. 8826)

- Liatris spicata* (L.) Willd. Dense blazing star. Occasional, dry woods, low to mid-elevations, throughout.
- Liatris squarrosa* (L.) Michx. Scaly blazing star. Rare, dry limestone woods, low elevations. White Oak Sink (Blount Co.) (PSW).
- Liatris squarrulosa* Michx. Blazing star. Occasional, dry woods, low to mid-elevations, throughout. (*L. scariosa* (L.) Willd. of Hoffman).

Matricaria (Gen. 9339)

- **Matricaria matricarioides* (Lessing) Porter. Pineappleweed. Scarce, lawns and roadsides, low elevations. First collected by Matthew Hickler in 1977. (see Rogers and Bowers 1977 for first Tennessee record).

ASTERACEAE (Cont.)

Parthenium (Gen. 9138)

Parthenium integrifolium L. Wild quinine. Apparently rare, dry woods, low elevation. Known from a single collection: ridge near Abrams Falls (Blount Co.; Sharp S-158).

Pluchea (Gen. 8941)

Pluchea camphorata (L.) DC. Camphorweed. Apparently rare, creek bank, low elevation. Known from a single collection: Lower Abrams Creek area (Blount Co.; Sharp and Jennison 811).

Polymnia (Gen. 9122)

Polymnia canadensis L. Leaf-cup. Rare, limestone woods and rocky slopes, low elevations (Blount Co.)(PSW).

Polymnia uvedalia L. Bear's foot. Frequent, mesic to submesic woods and thickets, low to mid-elevations, throughout.

Prenanthes (Gen. 9606)

Prenanthes alba L. White rattlesnakeroot. Attributed to GRSM by Hoffman and others; however, no collections exist in the park herbarium and specimens of this genus at TENN are missing. Not unlikely in our flora.

Prenanthes altissima L. Tall rattlesnakeroot. Common, mesic to submesic woods, low to high elevations, throughout.

Prenanthes roanensis (Chickering) Chickering. Roan's rattlesnakeroot. Frequent, balds, rocky woods, trailsides, high elevations, central and eastern GRSM. The stiff dark hairs on the involucres mark this species.

Prenanthes serpentaria Pursh. Scarce, woods and thickets, low elevations. Collected from Cades Cove and White Oak Sink (Blount Co.) (PSW).

Prenanthes trifoliolata (Cass.) Fern. Lion's foot. Frequent, submesic to subxeric woods, low to mid-elevations, throughout.

Pyrrhopappus (Gen. 9604)

Pyrrhopappus carolinianus (Walt.) DC. False dandelion. Frequent, roadsides, old fields, low elevations, throughout.

Rudbeckia (Gen. 9178)

Rudbeckia fulgida Ait. Orange coneflower. Occasional, dry woods and thickets, low elevations. The collections are from western GRSM (Blount Co.). The leaves are narrowly ovate to lanceolate (ovate in *R. umbrosa* Boynt. & Beadl.).

**Rudbeckia hirta* L. var. *hirta*. Black-eyed susan. Common, fields, balds, roadsides, low to high elevations, throughout. (*R. scrotina* Nutt.). Native to midwestern U.S.

**Rudbeckia hirta* var. *pulcherrima* Farw. Narrow-leaved black-eyed susan. Common, fields, balds, roadsides, low to high elevations, throughout. (*R. serotina* var. *sericea* (T. V. Moore) Fern. & Schub.) Native to midwestern U.S.

ASTERACEAE (Cont.)

- Rudbeckia laciniata* var. *humilis* Gray. Coneflower. Common, seeps, moist streamside thickets, low to high elevations, throughout. (Included in *R. laciniata* L. in R).
- Rudbeckia triloba* L. Three-lobed black-eyed susan. Occasional, dry woods and thickets, low elevations. Collected from Blount, Sevier, and Swain Counties. The receptacular bracts are conspicuously awn-tipped, and the leaves are 3 or more divided.
- Rudbeckia umbrosa* C. L. Boynt. & Beadle. Orange coneflower. Occasional, dry woods and thickets, low elevations. The collections are from western GRSM (Blount Co.). (Not in R).

Senecio (Gen. 9411)

- Senecio anonymus* Wood. Yellow ragwort. Common, roadsides, fields, moist thickets, low to mid-elevations, throughout. (*S. smallii* Britt.--see Kowal and Barkley 1973).
- Senecio aureus* L. Golden ragwort. Frequent, moist thickets, streamsides, low elevations, throughout.
- Senecio obovatus* Muhl. ex Willd. Spatulate-leaved ragwort. Occasional, dry, rocky woods, low elevations. Collected from Blount, Sevier, and Swain Counties.

Serinia (Gen. 9556)

- Serinia oppositifolia* (Raf.) Ktze. Opposite-leaved dwarf dandelion. Rare, old field, mid-elevation. Known from a single collection: near Elkmont (Sevier Co.; Jennison 348 at GRSM).

Sericocarpus (Gen. 8904)

- Sericocarpus asteroides* (L.) BSP. White-topped aster. Frequent, dry woods, low to mid-elevations, throughout. (*Aster paternus* Cronq. in R).
- Sericocarpus linifolius* (L.) BSP. Narrow-leaved white-topped aster. Occasional, dry woods, low elevations. The collections are from Blount County. (*Aster solidagineus* Michx. in R).

Silphium (Gen. 9131)

- Silphium astericus* L. Rosin-weed. Occasional, dry woods, low elevations. Cades Cove and Lower Abrams Creek (Blount Co.). Reports of *S. integrifolium* Michx. are based on this species.
- Silphium compositum* Michx. Rosin-weed. Scarce, dry woods, low elevations. Lower Abrams Creek area (Blount Co.) and western Swain County. Including *Silphium compositum* ssp. *reniforme* (Raf.) T. & G.
- Silphium dentatum* Elliott. Rosin-weed. Scarce, dry woods, low elevations. The stem is smooth and glaucous; otherwise, this species is similar to *S. astericus* L.

Solidago (Gen. 8849)

- Solidago arguta* Ait. Sharp-leaved goldenrod. Frequent, dry woods, thickets, low to mid-elevations, throughout. Including *S. boottii* Hook. of Hoffman's list (see also Cronquist 1980).

ASTERACEAE (Cont.)

- Solidago bicolor* L. Silverrod. Frequent, dry woods, roadside banks, low to high elevations, throughout. (Including *S. bicolor* var. *ovalis* Farw. of Hoffman's list).
- Solidago caesia* L. Blue-stemmed goldenrod. Rare, mesic woods, low elevations. The only collection is from White Oak Sink (Blount Co.; at TENN).
- Solidago canadensis* var. *scabra* (Muhl.) T. & G. Canada goldenrod. Frequent, fields, thickets, low to high elevations, throughout. (*S. altissima* L.; included in this species in R).
- Solidago curtisii* T. & G. Curtis' goldenrod. Common, submesic to subxeric woods and thickets, low to mid-elevations, throughout.
- Solidago erecta* Pursh. Erect goldenrod. Frequent, dry woods, banks, low to mid-elevations, throughout.
- Solidago flaccidifolia* Small. Thin-leaved goldenrod. Rare, submesic woods, low elevations. Western GRSM (Blount Co.) only. Resembles broad-leaved *S. curtisii* T. & G. (Included in *S. caesia* L. in R).
- Solidago flexicaulis* L. Zig-zag goldenrod. Occasional, rich, moist woods, low to mid-elevations, probably throughout but collected only from Blount and Sevier Counties.
- Solidago gigantea* Ait. Tall goldenrod. Frequent, fields, low elevations, probably throughout but the collections are from Blount and Sevier Counties.
- Solidago glomerata* Michx. Skunk goldenrod. Frequent, mesic woods and thickets, high elevations, throughout.
- Solidago hispida* Muhl. Yellow hairy goldenrod. Similar to *S. bicolor* L., but the florets are yellow. To be expected in GRSM; one collection bears this determination but there is no reference to flower color. Needs further verification.
- Solidago nemoralis* var. *haleana* Fern. Southern gray goldenrod. Frequent, roadsides and dry woods, low to high elevations, throughout. (Included in *S. nemoralis* Ait. in R).
- Solidago odora* Ait. Fragrant goldenrod. Frequent, dry woods, low to mid-elevations, throughout.
- Solidago patula* Muhl. ex Willd. Rough-leaved goldenrod. Occasional, marshes, streamside thickets, low to high elevations, throughout.
- Solidago puberula* Nutt. Hairy goldenrod. Frequent, roadsides and thickets, low to high elevations, throughout.
- Solidago roanensis* Porter. Roan's goldenrod. Frequent, open woods, thickets, balds, mid- to high elevations, throughout. (Including *S. roanensis* var. *monticola* (T. & G.) Fern.).
- Solidago rugosa* var. *aspera* (Ait.) Fern. Rough-stemmed goldenrod. Scarce, moist to dry thickets, in and near Cades Cove (Blount Co.) and western GRSM (Blount and Swain Cos.). (Included in *S. rugosa* Mill. in R).
- Solidago speciosa* Nutt. Showy goldenrod. Scarce, dry woods, low elevations. Cades Cove (Blount Co.; Rogers and Underwood 33929 at TENN). (Including *S. speciosa* var. *angustata* T. & G.).
- Solidago sphacelata* Raf. Heart-leaved goldenrod. Scarce, dry rocky woods, low elevations. Western GRSM (Blount Co.).

Sonchus (Gen. 9595)

- **Sonchus asper* (L.) Hill. Spiny-leaved sonchus. Scarce, roadsides, low to mid-elevations (Blount, Sevier, and Haywood Cos.) (PSW). Native to Europe.

ASTERACEAE (Cont.)

Taraxacum (Gen. 9592)

- **Taraxacum erythrospermum* Andrz. ex Besser. Red-seeded dandelion. Apparently scarce. Known from a single collection near Elkmont (Sevier Co.). Native to Europe.
- **Taraxacum officinale* Weber. Common dandelion. Common, roadsides, fields, lawns, low to high elevations, throughout. Native to Europe.

Verbesina (Gen. 9218)

- Verbesina occidentalis* (L.) Walt. Wingstem. Occasional, fields, roadsides, thickets, low elevations. Probably throughout, but collected from Blount, Sevier, and Haywood Counties.
- Verbesina virginica* L. Tickweed. Rare, roadside, low elevation. Collected only from Cades Cove (Blount Co.) (PSW).

Vernonia (Gen. 8751)

- Vernonia gigantea* (Walt.) Trel. ex Branner & Coville. Tall ironweed. Occasional, fields and roadsides, low elevations, probably throughout (collected from Blount, Sevier, and Haywood Cos.). (*V. altissima* Nutt. of Hoffman's list). (Not in R).
- Vernonia noveboracensis* (L.) Michx. New York ironweed. Scarce, fields, low elevations. Known only from Cades Cove (Blount Co.).

Xanthium (Gen. 9148)

- **Xanthium strumarium* L. Cocklebur. Scarce, fields, roadsides, low elevations, probably scattered throughout, but not often collected. Native to Europe.

BALSAMINACEAE (Fam. 105)

Impatiens (Gen. 4856)

- Impatiens capensis* Meerb. Orange jewelweed, touch-me-not. Common, marshes, streamsides, wet ground, thickets, throughout.
- Impatiens pallida* Nutt. Pale jewelweed, touch-me-not. Common, moist woods, coves, thickets, throughout. In *I. pallida* f. *speciosa* Jennings, the flowers are creamy-white (this form has been seen only rarely in the park).

BERBERIDACEAE (Fam. 65)

Berberis (Gen. 2566)

- **Berberis thunbergii* DC. Japanese barberry. Rare escape. Planted near Sugarlands Visitor Center and at Twin Creeks, seedlings are found in the woods surrounding at least the latter area. Native to E. Asia. Some are the purple-leaved variety, *Berberis thunbergii* var. *atropurpurea* Chenault (escaped near Twin Creeks) (PSW).
- **Berberis vulgaris* L. Common barberry. Rare escape, not seen in some 40 years, and thus may have become extirpated. Native to Europe. (Not in R).

BERBERIDACEAE (Cont.)

Caulophyllum (Gen. 2565)

Caulophyllum thalictroides (L.) Michx. Blue cohosh. Frequent in rich moist woods, except the high elevations, throughout.

Diphylleia (Gen. 2560)

Diphylleia cymosa Michx. Umbrella leaf. Frequent, streamsides and seepage areas, mid- to upper elevations, throughout.

Podophyllum (Gen. 2558)

Podophyllum peltatum L. May-apple. Common, moist hardwood stands, throughout.

BETULACEAE (Fam. 45)

Alnus (Gen. 1888)

Alnus serrulata (Ait.) Willd. Common alder. Frequent along streams and in swamps, occasionally along dry roadsides, low to mid-elevations.

Betula (Gen. 1887)

Betula cordifolia Regel. Heart-leaved paper birch or mountain paper birch. Rare; only one locale and three trees presently known in Tennessee. The pink-orange overtones to the bark and cordate leaf bases mark this Appalachian species (Sevier Co.).

Betula lenta L. Black or sweet birch. Mesic to submesic hardwood and hemlock stands. Low to mid-elevations, throughout.

Betula lutea Michaux f. Yellow birch. Common, mostly along streams at lower elevations, this tree occurs in a variety of topographic situations at high elevations, where it is a dominant in northern hardwoods and spruce-yellow birch stands. (*B. alleghaniensis* Britt.).

Betula nigra L. River birch. Occasional along rivers and streams, low to mid-elevations.

**Betula pendula* Roth. European weeping birch. Rare, persistent after cultivation, along Rt. 441 below Newfound Gap (Swain Co.) (PSW). Native to Europe.

Carpinus (Gen. 1884)

Carpinus caroliniana Walt. American hornbeam, ironwood, or blue beech. Common, along rivers and streams, low to mid-elevations, throughout. (Including *C. caroliniana* var. *virginiana* (Marsh.) Fern. of Hoffman (1964)).

Corylus (Gen. 1886)

Corylus americana Walt. American hazel. Infrequent, dry woods, thickets, and old fields, low elevations.

Corylus cornuta Marsh. Beaked hazel. Rare, currently known from only one locale, near High Rocks (Swain Co.).

BETULACEAE (Cont.)

Ostrya (Gen. 1885)

Ostrya virginiana (Mill.) K. Koch. Hop-hornbeam. Occasional, mesic to submesic mixed hardwood and oak stands, low to mid-elevations, throughout. (Including *O. virginiana* var. *lasia* Fern., of Stupka (1964)).

BIGNONIACEAE (Fam. 154)

Bignonia (Gen. 7705)

Bignonia capreolata L. Cross-vine. Frequent along streams, in moist woods, thickets, and along roadsides, low elevations. (*Anisostichus capreolata* (L.) Bureau).

Campsis (Gen. 7714)

Campsis radicans (L.) Seem. Trumpet-creeper. Occasional, along streams, roadsides, in thickets, old homesites, low elevations.

Catalpa (Gen. 7727)

**Catalpa speciosa* Warder. Northern catalpa. Rare escape, disturbed ground, old homesites, low elevations. This species is native in the Southeast, west of the Appalachian mountain chain.

BORAGINACEAE (Fam. 149)

Cynoglossum (Gen. 7064)

Cynoglossum virginianum L. Wild comfrey. Occasional, moist to dry woods, low elevations. Collected from Cades Cove, White Oak Sink (Blount Co.).

Echium (Gen. 7118)

**Echium vulgare* L. Blueweed. Rare, open ground, thickets, roadsides. One collection: vicinity Big Creek (Haywood Co.) at 3,500 ft. Native to Europe.

Hackelia (Gen. 7064B)

Hackelia virginiana (L.) I. M. Johnston. Beggar's lice. Scarce, mesic woods and thickets, low to mid-elevations, throughout.

Lithospermum (Gen. 7109)

**Lithospermum arvense* L. Corn gromwell. Occasional, roadsides, fields, low elevations, probably throughout but not much collected. Native to Europe. *Lithospermum canescens* (Michx.) Lehmann. Orange puccoon. Rare, limestone woods, low elevation. Known only from White Oak Sink (Blount Co.) (PSW).

BORAGINACEAE (Cont.)

Mertensia (Gen. 7102)

Mertensia virginica (L.) Pers. Virginia bluebell. Rare, mesic woods over limestone, Cades Cove and White Oak Sink (Blount Co.).

Myosotis (Gen. 7100)

Myosotis macrosperma Engelm. Large-seeded forget-me-not. Scarce, moist thickets, low to mid-elevations. Collected from TENN (Blount and Sevier Counties).

**Myosotis scorpioides* L. Forget-me-not. Scarce, wet ground near old homesites, low elevations. Sevier County only. Native to Europe.

Myosotis verna Nutt. Early forget-me-not. Rare, wet ground, low elevation. Collected near "Mt. Sterling Ranger Station" (Haywood Co.; Ream 182, TENN).

BRASSICACEAE (Cruciferae; Fam. 73)

Arabidopsis (Gen. 2999A)

**Arabidopsis thaliana* (L.) Heynh. Mouse-ear cress. Scarce, dry woods, roadsides, low elevations. A single collection inside GRSM: Cades Cove (Blount Co.). (PSW; the Hoffman report was based on specimens found outside the park).

Arabis (Gen. 3001)

Arabis canadensis L. Sicklepod. Frequent, rocky woods, thickets, low to mid-elevations, throughout.

Arabis laevigata (Muhl. ex Willd.) Poir var. *laevigata*. Smooth rockcress. Frequent, mesic, rocky woods, thickets, streamsides, low to mid-elevations, throughout.

Arabis laevigata var. *burkii* Porter. Burk's rockcress. Rare; the only documented locale is "near Bushnell" (Swain Co., Correll 3763, DUKE). The leaves are sessile, not clasping.

Arabis lyrata L. Lyre-leaved rockcress. Scarce, dry rock outcrops, low elevations. Along Little River Gorge (Blount and Sevier Cos.).

Barbarea (Gen. 2961)

**Barbarea verna* (Mill.) Aschers. Early watercress. Apparently scarce in the park. A single collection: Cades Cove (Jennison 4253, GRSM and TENN). Native to Europe.

**Barbarea vulgaris* L. Wintercress. Frequent, roadsides, disturbed soil, low to mid-elevations, throughout. Native to Europe. (Including *B. vulgaris* var. *arcuata* (Upiz.) Fries. of Hoffman's list).

Brassica (Gen. 2949)

**Brassica juncea* var. *crispifolia* Bailey. Chinese mustard. Scarce, roadside, low elevation. Collected from Cades Cove (Blount Co.). Native to Eurasia. (Included in *B. juncea* (L.) Coss. in R).

BRASSICACEAE (Cont.)

**Brassica rapa* L. Rape mustard. Occasional, fields and roadsides, low elevations, throughout. Native to Eurasia. (*B. napus* L. in R).

Capsella (Gen. 2986)

**Capsella bursa-pastoris* (L.) Medic. Shepherd's purse. Occasional, lawns, roadsides, low elevations, throughout. Native to Europe.

Cardamine (Gen. 2966)

Cardamine clematitis Shuttlw. Mountain watercress. Scarce, cool springs and streamsides, mid- to high elevations.

Cardamine flagellifera O. E. Schulz. Bittercress. Rare, seeps, streamsides, low elevations. Three collections (Blount and Swain Cos.). (Not in R).

**Cardamine hirsuta* L. Hairy bittercress. Common, lawns, roadsides, low to mid-elevations, throughout. Native to Europe.

Cardamine parviflora L. Small-flowered bittercress. Frequent, streamsides, low to mid-elevations, throughout. (Including *C. parviflora* var. *arenicola* (Britt.) O. E. Schultz of Hoffman 1964).

Cardamine pensylvanica Muhl. Pennsylvania bittercress. Apparently rare, though probably confused with *C. parviflora*. One collection: Cataloochee, streamside at 3,000 ft (Jennison 3843 at TENN).

Conringia (Gen. 3055)

**Conringia orientalis* (L.) Dum. Hare's ear mustard. Scarce, roadside, low elevation. Known from near Elkmont and Cherokee Orchard (Sevier Co.) and Cades Cove (Blount Co.) (PSW). Native to Europe. (Rogers and Bowers 1973)

Dentaria (Gen. 2967)

Dentaria diphylla Michx. Toothwort, crinkleroot. Common, moist woods, streamsides, except the highest elevations, throughout. (*Cardamine diphylla* (Michx.) Wood in R).

Dentaria heterophylla Nutt. Pepperwort. Very rare; known from a single station, on limestone in White Oak Sink (Blount Co.). (*Cardamine angustata* O. E. Schultz var. *angustata* in R).

Dentaria laciniata Muhl. Cut-leaved toothwort. Frequent, rich moist woods, low to mid-elevations, throughout. (*Cardamine concatenata* (Michx.) Ahles in R).

Dentaria multifida Muhl. Toothwort, pepperwort. Rare; known from two collections, Cades Cove, limestone woods (Blount Co.) (PSW). (*Cardamine angustata* var. *multifida* (Muhl.) Ahles in R).

Draba (Gen. 2989)

Draba brachycarpa Nutt. ex T. & G. Short-fruited Whitlow grass. Known from a single collection: roadside near Headquarters (Sevier Co.; Shanks and Iltis at TENN).

Draba ramosissima Desvaux. Branched Whitlow grass. Scarce, dry outcrops, both shaded and open, vicinity of Abrams Creek and Rt. 129 (Blount Co.) (PSW).

BRASSICACEAE (Cont.)

- **Draba verna* L. Whitlow grass. Apparently scarce, roadsides, fields, lawns. Collected from Oconaluftee (Swain Co.) and Cades Cove (Blount Co.). Native to Europe.

Erysimum (Gen. 3004)

- **Erysimum cheiranthoides* L. Worm-seed mustard. Rare, roadsides, low elevations. The single collection is from Twin Creeks (Sevier Co.) (PSW). Native to Europe.

Lepidium (Gen. 2883)

- **Lepidium campestre* (L.) R. Br. Cow-cress. Apparently scarce, roadsides, disturbed soil. Two collections (Haywood, Swain Cos.). Native to Europe.
Lepidium virginicum L. Poor man's pepper. Frequent, roadsides, fields, low elevations, throughout.

Lunaria (Gen. 2969)

- **Lunaria annua* L. Moneyplant. Rare introduction, house yards, low elevations. Collected at Twin Creeks, Sevier County (PSW). (Not in R). Native to Eurasia.

Nasturtium (Gen. 2965)

- **Nasturtium officinale* R. Br. Watercress. Occasional, springs and streams, low elevations, throughout. Native to Europe.

Rorippa (Gen. 2965B)

- Rorippa islandica* var. *fernaldiana* Butt. & Abbe. Yellow-cress. Scarce, wet grounds, streamsides, low elevations. (Included in *R. islandica* (Oeder) Barbas. in R).

Sibara (Gen. 3001A)

- Sibara virginica* (L.) Rollins. *Sibara*. Occasional, dry fields, thickets, low elevations. The collections are from Cades Cove (Blount Co.) (*Arabis virginica* (L.) Trelease).

Sisymbrium (Gen. 2917)

- **Sisymbrium officinale* (L.) Scop. Hedge-mustard. Occasional, roadsides, old fields. Collected from Cades Cove (Blount Co.) and Elkmont (Sevier Co.). Native to Europe.

Thlaspi (Gen. 2903)

- **Thlaspi perfoliatum* L. Pennycress. A single collection: along Little River Road, Sevier County (Hoss 23011 at TENN). Native to Europe.

BUXACEAE (Fam. 94)

Buxus (Gen. 4533)

**Buxus sempervirens* L. Boxwood. A conspicuous shrub, long persistent at old homesites but probably not spreading by seed.

CALLITRICHACEAE (Fam. 93)

Callitriche (Gen. 4530)

Callitriche deflexa A. Braun. Water star-wort. Rare, wet meadow, low elevation. Cades Cove (Blount Co.) (PSW). (Rogers and Bowers 1969).

Callitriche heterophylla Pursh. Water star-wort. Scarce, streams, low elevations. Collected from Blount, Haywood, and Swain Counties (PSW).

CALYCANTHACEAE (Fam. 68)

Calycanthus (Gen. 2663)

Calycanthus floridus var. *laevigatus* (Willd.) Torr. & Gray. Sweetshrub. Common, subxeric to dry woods, low to mid-elevations, throughout. The leaves of these plants in GRSM are glabrous or nearly so; hence, this taxon seems the only one represented.

CAMPANULACEAE (Fam. 167)

Campanula (Gen. 8644)

Campanula americana L. Tall bellflower. Occasional, mesic woods and thickets, low to mid-elevations, throughout.

Campanula aparinoides Pursh. Marsh bluebell. Very rare, marshy depression in old pasture, low elevations. Cades Cove only (Blount Co.). Listed by Tennessee Committee for Rare Plants (1978); rediscovered in 1980.

Campanula divaricata Michx. Southern harebell. Common, submesic to subxeric woods, trailsides, low to mid-elevations, throughout.

Lobelia (Gen. 8694)

Lobelia cardinalis L. Cardinal flower. Frequent, wet ground, roadside ditches, streamside thickets, low to mid-elevations, throughout.

Lobelia inflata L. Indian tobacco. Frequent, old fields, roadsides, along trails, low to mid-elevations, throughout.

Lobelia puberula Michx. Downy lobelia. Occasional, moist woods and thickets, streamsides, roadsides, low to mid-elevations, throughout.

Lobelia siphilitica L. Great lobelia. Occasional, moist woods and thickets, streamsides, low elevations, throughout.

Lobelia spicata var. *leptostachya* (A. DC.) Mackenz. & Bush. Rare, submesic rocky woods, low elevations. Collected recently at White Oak Sink (Blount Co.); Jennison (1939a) cited an older collection from Swain Co. (Included in *L. spicata* Lam. in R).

CAMPANULACEAE (Cont.)

Specularia (Gen. 8649)

Specularia perfoliata (L.) A. DC. Venus' looking-glass. Frequent, young woods, fields, roadsides, low to mid-elevations, throughout.

CANNABACEAE (Fam. 49)

Cannabis (Gen. 1973)

**Cannabis sativa* L. Hemp, marijuana. Rare escape, low elevations, one station, along Rt. 73 (Sevier Co. only) (PSW). Native to Asia. (Not in R).

CAPPARIDACEAE (Fam. 72)

Cleome (Gen. 3082)

**Cleome houtteana* Raf. Spider flower. Scarce, old fields, thickets, roadsides, low elevations. Native to the American tropics. (*C. spinosa* Jacq.).

CAPRIFOLIACEAE (Fam. 162)

Diervilla (Gen. 8524)

Diervilla sessilifolia Buckl. Sessile-leaved bush-honeysuckle. Common, heath balds, seeps, landslide scars, woods edges, high elevations, throughout.

Linnaea (Gen. 8520)

Linnaea borealis L. Twinflower. Very rare and perhaps extirpated. Based on a single collection at TENN: "mountain woods, Sevier Co." (Albert Ruth, unnumbered, 9/12/1892, at TENN) (White 1981). (Not in R).

Lonicera (Gen. 8523)

Lonicera canadensis Marsh. Canadian honeysuckle. Infrequent, moist rocky woods, mid- to high elevations.

**Lonicera japonica* Thunb. Japanese honeysuckle. Frequent, old homesites, old fields, roadsides, streamside woods, low elevations. Generally found in disturbed areas, sometimes forming large thickets. Native to E. Asia.

**Lonicera korolkowii* Stapf. Small-leaved honeysuckle. Rare; persistent after cultivation, low elevations. Collected from the Sugarlands area (Sevier Co.) (PSW). Native to Asia.

**Lonicera morrowii* Gray. Morrow's honeysuckle. Rare escaped plant near Twin Creeks (Sevier Co.) (PSW). The specimens are sterile but match this species in leaf. Native to E. Asia. *Lonicera maackii* Maxim. has been collected just outside GRSM near Gatlinburg, where it was persistent after cultivation.

**Lonicera sempervirens* L. Trumpet honeysuckle. Scarce, thickets, old homesites, low elevations. Native to the eastern U.S., but introduced in GRSM.

Sambucus (Gen. 8515)

Sambucus canadensis L. American elder. Common, thickets, seeps, streamsides, openings, low to mid-elevations, throughout.

CAPRIFOLIACEAE (Cont.)

Sambucus pubens Michx. Red-berried elder. Common, woods and thickets, throughout but most common at high elevations.

Symphoricarpos (Gen. 8518)

**Symphoricarpos orbiculatus* Moench. Coral berry. Occasional in disturbed areas, roadsides, old homesites, old fields, throughout. Native to E. North America but introduced to the park.

Triosteum (Gen. 8517)

Triosteum aurantiacum Bickn. Horse-gentian. Rare, moist woods and thickets. Collected from Hemphill Bald, ca 5,000 ft (Haywood Co.) and White Oak Sink, ca 1,800 ft (Blount Co.).

Viburnum (Gen. 8516)

Viburnum acerifolium L. Maple-leaved viburnum. Common, submesic to xeric woods, thickets, low to mid-elevations, throughout. (Including *V. acerifolium* var. *glabrescens* Rehd.).

Viburnum alnifolium Marsh. Hobblebush, witch-hobble. Common, moist woods, mid- to high elevations, throughout.

Viburnum cassinoides L. Wild raisin. Frequent, dry woods, heath balds, thickets, seeps, spruce-fir, low to high elevations, throughout.

Viburnum dentatum L. Arrow-wood. Occasional, swamps, moist woods, thickets, except at the highest elevations. A variable taxon; *Viburnum recognitum* Fern. of Hoffman (1964) cannot be justified in the GRSM flora, based on existing herbarium specimens. A specimen of *V. acerifolium* f. *ovatum* Rehd. (in Hoffman 1964) also belongs here.

**Viburnum lantana* L. Way-faring tree. Rare escape from cultivated plants, vicinity of Twin Creeks (Sevier Co.) (PSW). Native to Europe. (Not in R).

**Viburnum opulus* L. Highbush cranberry. Rare, persistent at old homesites, low elevations (Sevier, Swain Cos.). Native to Europe. (Not in R).

Viburnum prunifolium L. Smooth blackhaw. Infrequent, wet thickets, low elevations, Cades Cove (Blount Co.) and vicinity of Gatlinburg (Sevier Co.).

Viburnum rufidulum Raf. Rusty blackhaw. Rare, dry slopes, usually over limestone, western GRSM (Blount Co.).

CARYOPHYLLACEAE (Fam. 61)

Agrostemma (Gen. 2488)

**Agrostemma githago* L. Corncockle. Rare introduction, fields, low elevations. The single collection is from Elkmont, Sevier County (Jennison 254, at GRSM). Native to Europe.

Arenaria (Gen. 2443)

**Arenaria serpyllifolia* L. Thyme-leaved sandwort. Infrequent and overlooked, disturbed soil along roads, probably throughout. Native to Europe.

CARYOPHYLLACEAE (Cont.)

Cerastium (Gen. 2430)

- **Cerastium brachypetalum* Pers. Short-petalled chickweed. Rare, old fields, low elevations. Collected from Greenbrier area, Sevier County (Morrison 163 at TENN). Native to Europe. (Rogers and Bowers 1971).
- **Cerastium glomeratum* Thuillier. Mouse-ear chickweed. Occasional, fields, low elevations. Collected from Sevier County (*C. viscosum* L.). Native to Europe.
- **Cerastium holosteoides* var. *vulgare* (Hartman) Hylander. Common mouse-ear chickweed. Occasional, old fields, roadsides, low to mid-elevations, throughout. The collections are from Blount County. Native to Europe.
- Cerastium nutans* Raf. Nodding checkweed. Occasional, fields, low elevations, throughout.

Dianthus (Gen. 2502)

- **Dianthus armeria* L. Deptford pink. Occasional, roadsides, fields, low to mid-elevations, throughout. Native to Europe.
- **Dianthus barbatus* L. Sweet William. Rare escape; collected from Cades Cove (Blount Co.; Jennison and Wallace 1518 at TENN).

Lychnis (Gen. 2491)

- **Lychnis alba* Mill. White campion. Scarce, roadsides. The collections are from Sevier and Swain Counties. Native to Eurasia.
- **Lychnis coronaria* (L.) Desr. Rose campion. Rare introduction; the single collection is from Sevier County (Hoffman, unnumbered, at GRSM). Native to S. Europe.

Paronychia (Gen. 2475)

- Paronychia canadensis* (L.) Wood. Forked chickweed. Infrequent, submesic woods, trailsides, low to mid-elevations, throughout.
- Paronychia fastigiata* (Raf.) Fern. Forked chickweed. Scarce, presently known only from Cades Cove and Lower Abrams Creek (Blount Co.).

Sagina (Gen. 2433)

- **Sagina decumbens* (Ell.) T. & G. Pearlwort. Scarce, roadsides, disturbed ground, low elevations. The collections are from Sevier County. Native to eastern and midwestern U.S.

Saponaria (Gen. 2503)

- **Saponaria officinalis* L. Soapwort, bouncing-bet. Occasional, roadsides, fields, low elevations, throughout. Native to Europe.

Silene (Gen. 2490)

- Silene antirrhina* L. Sleepy catchfly. Scarce, roadsides, old fields, low elevations.

CARYOPHYLLACEAE (Cont.)

- **Silene cucubalus* Wibel. Bladder-campion. Scarce, disturbed soil, roadides, low to mid-elevations. Native to Eurasia. (Including *Silene cucubalus* var. *latifolia* (Reichenb.) G. Beck).
- Silene ovata* Pursh. Rough-leaved campion. Rare, mesic to submesic coves, woods, in the Cataloochee-Mt. Sterling area only (Haywood Co.).
- Silene rotundifolia* Nutt. Round-leaved campion. Rare. Known only from a single collection (Ferris in 1899, Missouri Botanical Gardens; brought to my attention by Jack Sharp) from Cades Cove (Blount Co.). A Cumberland Plateau species. (Not in R).
- Silene stellata* (L.) Ait. f. Starry campion. Frequent, submesic woods, low to mid-elevations, throughout.
- Silene virginica* L. Fire pink. Frequent, subxeric to xeric woods, roadsides, low to mid-elevations, throughout.

Stellaria (Gen. 2429)

- Stellaria corei* Shinnars. Core's chickweed. Occasional, rich woods, low to mid-elevations, throughout. (*S. pubera* var. *silvatica* (Benquinot) Weath. in Hoffman 1964).
- **Stellaria graminea* L. Common stitchwort. Occasional, moist fields, low to mid-elevations, throughout. Native to Europe.
- Stellaria longifolia* Muhl. Long-leaved stitchwort. Rare. Known from a single collection in Cades Cove (Blount Co.; Hoss 18856 at TENN). (Included in *S. graminea* L. in R).
- **Stellaria media* (L.) Vill. Common chickweed. Occasional, lawns, roadsides, low to mid-elevations, throughout. Native to Eurasia.
- Stellaria pubera* Michx. Star chickweed. Common, mesic to submesic woods, low to mid-elevations, throughout.

CELASTRACEAE (Fam. 100)

Celastrus (Gen. 4625)

- **Celastrus orbiculatus* Thunb. Oriental bittersweet. Rare, old homesites, escape near developed areas (Twin Creeks, Elkmont) (Sevier Co.). Native to E. Asia.
- Celastrus scandens* L. Climbing bittersweet. Rare, dry woods over limestone, White Oak Sink (Blount Co.) (PSW). Stupka (1964) discussed two sites for this plant, one in Cades Cove (Fleetwood (1934-1935) noted the plant near an old quarry; searching by Stupka and Shields and by myself has not revealed the plant since) and another near Fontana Dam (just outside the park)

Euonymus (Gen. 4618)

- Euonymus americanus* L. Heart's-a-busting. Common, moist woods and thickets, low to mid-elevations, throughout.
- Euonymus atropurpureus* Jacq. Wahoo. Rare, mesic woods near Sugarlands, White Oak Sink, and Rich Mountain Gap (Sevier and Blount Cos.).
- **Euonymus fortunei* Hand.-Mazz. Climbing euonymus. Rare, thickets and roadsides, low elevations. Two collections: Twin Creeks (Sevier Co.) and Deep Creek, on a cement bridge (Swain Co.). (PSW). Native to E. Asia.
- Euonymus obovatus* Nutt. Running strawberry-bush. Frequent, moist rocky woods, in association with cove hemlock and hardwoods, low to mid-elevations.

CHENOPODIACEAE (Fam. 55)

Chenopodium (Gen. 2223)

- *Chenopodium album L. White goosefoot, pigweed. Scarce, disturbed soil, low elevations. Two collections: Sevier and Swain Counties.
- *Chenopodium ambrosioides L. Fragrant goosefoot. Occasional, roadsides and old fields, low to mid-elevations, throughout.
- *Chenopodium murale L. Pigweed. Rare, roadside, low elevation, near Sugarlands (Sevier Co.) (PSW). Native to Europe.

CISTACEAE (Fam. 114)

Helianthemum (Gen. 5245)

- Helianthemum bicknellii Fern. Bicknell's frostweed. Rare and perhaps extirpated. Known only from Gregory's Bald (Bount Co.; TENN). Collected in 1934 and has not been rediscovered (the only Tennessee locale, Committee for Tennessee Rare Plants, 1978).

Lechea (Gen. 5248)

- Lechea racemulosa Michx. Pinweed. Frequent, dry woods, roadsides, low to high elevations, throughout.

CLETHRACEAE (Fam. 131)

Clethra (Gen. 6165)

- Clethra acuminata Michx. Mountain pepper-bush. Dry woods, low to mid-elevations, throughout.

COMPOSITAE - See ASTERACEAE

CONVOLVULACEAE (Fam. 146)

Calystegia (Gen. 6994)

- Calystegia sepia (L.) R. Brown. Hedge birdweed. Occasional, fields, roadsides, low elevations. (Convolvulus sepium L.; including C. sepium var. fraterniflorus Mackenz. & Bush).
- Calystegia spithamea (L.) R. Brown. Low bindweed. Occasional, roadsides, low elevations. Collected from Blount and Sevier Counties.

Cuscuta (Gen. 6968)

- Cuscuta campestris Yuncker. Field dodder. Occasional, moist thickets, low elevations, throughout.
- Cuscuta compacta Juss. Bracted dodder. Scarce, thickets, low elevations. Lower Abrams Creek (Blount Co.).
- Cuscuta gronovii Willd. Dodder. Rare or overlooked. Known from a Lower Abrams Creek collection (Blount Co.; Underwood and Hoffman, unnumbered, at TENN) (Including C. gronovii var. vulviviga Engelm.).

CONVOLVULACEAE (Cont.)

Cuscuta rostrata Shuttlw. ex Engelm. Beaked dodder. Frequent, fields, thickets, open woods, low to high elevations, throughout.

Ipomoea (Gen. 7003)

- **Ipomoea coccinea* L. Scarlet morning-glory. Infrequent, fields and roadsides, low elevations. Native to Tropical America.
- **Ipomoea hederacea* (L.) Jacq. Ivy-leaved morning-glory. Occasional, fields and roadsides, low elevations. Native to Tropical America.
- Ipomoea lacunosa* L. Small white morning-glory. Occasional, fields and roadsides, low elevations.
- Ipomoea pandurata* (L.) G. F. W. Mey. Wild potato vine. Occasional, fields and roadsides, low elevations.
- **Ipomoea purpurea* (L.) Roth. Purple morning-glory. Occasional, fields and roadsides, low elevations. Native to Tropical America.

CORNACEAE (Fam. 130)

Cornus (Gen. 6159)

- Cornus alternifolia* L. f. Alternate-leaved dogwood. Frequent, mesic woods and thickets, throughout.
- Cornus amomum* Mill. Silky dogwood. Occasional, streamside thickets, low ground, low elevations.
- Cornus florida* L. Flowering dogwood. Common, mesic to submesic woods, low to mid-elevations, throughout.

CRASSULACEAE (Fam. 78)

Sedum (Gen. 3161)

- **Sedum acre* L. Mossy stonecrop. Rare, near old hotel site, mid-elevation. One collection (Swain Co.). Native to Europe.
- **Sedum sarmentosum* Bunge. Stonecrop. Rare introduction, shaded rocks, low elevations. Elkmont (where it is distant from houses) and Twin Creeks (Sevier Co.) (PSW). Native to E. Asia.
- **Sedum spectabile* Boreau. Showy stonecrop. Rare introduction, old roadside, low elevation; a single collection near Schoolhouse Gap (Blount Co.) (PSW). Origin uncertain, originally cultivated in Japan.
- **Sedum telephium* L. Orpine. Rare introduction, old homesite, low elevation, a single collection (Sevier Co.). Native to Eurasia. (Not in R).
- Sedum ternatum* Michx. Wild stonecrop. Common, on boulders, tree bases, or soil, moist woods, streamsides, throughout.

CRUCIFERAE - See BRASSICACEAE

CUCURBITACEAE (Fam. 166)

Melothria (Gen. 8562)

- Melothria pendula* L. Melonette. Rare, thickets, old homesites, low elevations. Collected from Blount and Sevier Counties.

DIAPENSIACEAE (Fam. 134)

Galax (Gen. 6277)

Galax aphylla L. Galax. Common in dry woods, throughout, but infrequent at the highest elevations.

DIPSACACEAE (Fam. 165)

Dipsacus (Gen. 8540)

**Dipsacus sylvestris* Huds. Teasel. Rare escape; the only park collection comes from the Cataloochee area (Haywood Co.). Native to Europe.

DROSERACEAE (Fam. 76)

Drosera (Gen. 3136)

Drosera rotundifolia L. Sundew. Rare, landslide scars, wet rocks, boggy sites, high elevations (Sevier, Swain Cos.).

EBENACEAE (Fam. 138)

Diospyros (Gen. 6406)

Diospyros virginiana L. Persimmon. Frequent, dryish woods, thickets, old fields, roadsides, and margins of sinkhole ponds (Cades Cove, White Oak Sink), low elevations, throughout.

ERICACEAE (Fam. 133)

Epigaea (Gen. 6205)

Epigaea repens L. Trailing arbutus. Common, dry woods and heath balds, low to high elevations, throughout.

Gaultheria (Gen. 6206)

Gaultheria procumbens L. Wintergreen. Common, subxeric to xeric woods, heath balds, throughout.

Gaylussacia (Gen. 6215)

Gaylussacia baccata (Wang.) K. Koch. Black huckleberry. Frequent, xeric woods, low to mid-elevations, throughout.

Gaylussacia ursina (M. A. Curtis) T. & G. ex Gray. Bear huckleberry. Common, submesic woods, low to mid-elevations, throughout.

Kalmia (Gen. 6192)

Kalmia latifolia L. Mountain laurel. Common, dry woods, heath balds, steep slopes, throughout.

ERICACEAE (Fam. 133)

Leiophyllum (Gen. 6188)

Leiophyllum buxifolium var. *prostratum* (Loudon) Gray. Sand myrtle. Frequent, heath balds, rock outcrops, mid- to high elevations. Leaves are opposite in all specimens examined, and so there seems to be only this taxon present (sensu key in Radford et al. 1968).

Leucothoe (Gen. 6198)

Leucothoe fontanesiana (Steud.) Sleumer. Dog-hobble. Frequent, rocky streamsides, mesic to subxeric woods, heath balds, throughout.

Leucothoe recurva (Buckley) Gray. Deciduous leucothoe. Infrequent but well-distributed, subxeric to xeric woods, heath balds, mid-elevations.

Lyonia (Gen. 6200)

Lyonia ligustrina (L.) DC. Maleberry. Frequent, subxeric to xeric woods, thickets, heathbalds, low to high elevations, throughout (including *L. ligustrina* var. *foliosiflora* (Michx.) Fern.).

Menziesia (Gen. 6185)

Menziesia pilosa (Michx.) Juss. Minniebush. Frequent, moist woods and thickets, high elevations, central and eastern GRSM only.

Oxydendrum (Gen. 6203)

Oxydendrum arboreum (L.) DC. Sourwood. Common, submesic to xeric woods, low to mid-elevations, throughout.

Pieris (Gen. 6200A)

Pieris floribunda (Pursh) B. & H. Mountain pieris. Infrequent, dry woods and heathbalds, mid-elevations, central and eastern GRSM.

Rhododendron (Gen. 6184)

Rhododendron arborescens (Pursh.) Torr. Sweet azalea. Scarce, streamsides at low elevations, throughout; also Gregory Bald. (Including *R. arborescens* var. *richardsonii* Rehd.). This species and *R. bakeri* (Lemon & McKay) Hume and *R. viscosum* (L.) Torr. are involved in the unique and genetically complex azalea display on Gregory Bald. The great variability is apparently due to hybridization. *R. arborescens* is a mid-season bloomer with leaves, petioles, twigs, and winter buds glabrous to glabrate.

Rhododendron bakeri (Lemmon & McKay) Hume. Cumberland azalea. Rare; known only from Gregory Bald (Blount and Swain Cos.). (Not in R). A late, red-flowered species.

Rhododendron calendulaceum (Michx.) Torr. Flame azalea. Common, submesic to xeric woods and thickets, low to high elevations, throughout.

Rhododendron catawbiense Michx. Catawba rhododendron. Common, heath balds, spruce-fir, mexic woods, mid- to high elevations, throughout.

ERICACEAE (Cont.)

- Rhododendron maximum* L. Rosebay rhododendron. Common, streamsides, ravines, steep slopes, heath balds, low to high elevations, throughout.
- Rhododendron minus* Michx. Small-leaved rhododendron, Piedmont rhododendron. Frequent, cliffs, heath balds, exposed ridges at high elevations, streamsides at low elevations in the western GRSM. Duncan and Pollen (1962) demonstrated the low and high elevation populations cannot be regarded as different species.
- Rhododendron nudiflorum* (L.) Torr. Pixter-bush. Infrequent, dry woods, low elevations. Lower Abrams Creek area and scattered populations elsewhere. The leaves, winter buds, petioles, and twigs are glabrous to glabrate. As interpreted here, *R. nudiflorum* includes collections previously determined as *R. canescens* (Michx.) Sweet. See *R. roseum* (Loisel.) Rehd. below.
- Rhododendron roseum* (Loisel.) Rehd. Pink azalea. Rare, submesic woods, mid-elevations. The collection (Jennsion and McDowell 4442 at GRSM) is from Haywood County. This species is close to *R. nudiflorum* (L.) Torr. and *R. canescens* (Michx.) Sweet. As interpreted here (from Galle 1974 and Radford et al. 1968), *R. nudiflorum* has glabrous to glabrate leaves, petioles, twigs, and winter buds (definitely hairy in *R. roseum*). Occasional stipitate glands occur on the corolla of *R. nudiflorum* in the collections examined from GRSM, although Galle (1974) claimed they were absent. None of the collections have canescent young leaves (a characteristic of *R. canescens*); hence, that species is dropped from the checklist.
- Rhododendron viscosum* (L.) Torr. Clammy azalea. Rare; known only from Gregory and Parsons Balds (Blount and Swain Cos.). Our plants are referable to *R. viscosum* var. *montanum* Rehd. (Including *R. viscosum* f. *glaucum* (Lah.) Voss. of Hoffman's list).

Vaccinium (Gen. 6216)

- Vaccinium angustifolium* Ait. Lowbush blueberry. Rare, rock outcrops, dry woods, mid- to high elevations (Haywood, Sevier Cos.; White (1982)). Small, toothed, glabrous, nonglaucous leaves characterize this species. (Reported in Hoffman (1966b)). (Not in R).
- Vaccinium arboreum* Marsh. Sparkleberry. Scarce, dry woods, low elevations, Lower Abrams Creek area (Blount Co.) and western Swain County.
- Vaccinium constablaei* Gray. Tall woodland blueberry. Frequent, submesic to xeric woods, thickets, low to mid-elevations, throughout. A variable plant: the leaves are toothed or entire, usually hairy on the mid-vein, above and beneath; the twigs are usually hairy in lines and the fruits vary from glaucous to black. Reports of *V. corymbosum* L. and *V. atrococcum* (Gray) Heller cannot be substantiated based on herbarium specimens. I am unaware of any characters to separate *Vaccinium simulatum* of some authors from *V. constablaei* and, hence, include that taxon here (as in R).
- Vaccinium erythrocarpum* Michx. Mountain cranberrybush. Frequent, moist woods, balds, high elevations. A distinctive, easily identified species.
- Vaccinium hirsutum* Buckl. Hairy blueberry. Scarce, dry woods, thickets, grassy balds. Apparently known only from western GRSM, where frequent, mid- to high elevations. A distinctive species with hairy fruits.

ERICACEAE (Cont.)

Vaccinium pallidum Ait. Pale lowbush blueberry. Common, dry woods, thickets, balds, low to high elevations, throughout. This species closely resembles *V. vacillans* Torr.; *V. pallidum* has toothed leaves (entire in *V. vacillans*; *V. pallidum* is included in *V. vacillans* in R).

Vaccinium stamineum L. var. *stamineum*. Deerberry. Common, submesic to xeric woods, low to mid-elevations, throughout. The following varieties can be found in GRSM:

Vaccinium stamineum var. *candicans* (Small) Mohr. The leaves hairy and strongly glaucous below. Common in GRSM. (Included in *V. stamineum* L. in R).

Vaccinium stamineum var. *melanocarpum* Mohr. Leaves less strongly glaucous below, hypanthium hairy. Occasional in GRSM.

Vaccinium stamineum var. *neglectum* (Small) Deam. Leaves glabrous and green below. Scarce in GRSM. (Included in *V. stamineum* L. in R).

Vaccinium stamineum var. *stamineum*. Leaves hairy, green beneath, the hypanthium glabrous. Occasional in GRSM.

Vaccinium vacillans Torr. Lowbush blueberry. Common, dry woods, thickets, grassy balds, low to high elevations, throughout (See *V. pallidum* Ait.)

EUPHORBIACEAE (Fam. 92)

Acalypha (Gen. 4407)

Acalypha gracilens Gray. Narrow-leaved three-seeded Mercury. Rare, dry limestone woods, low elevations. Cades Cove and Lower Abrams Creek (Blount Co.).

Acalypha ostryaefolia Riddell. Hornbeam-leaved three-seeded Mercury. Rare, dry woods, low elevations. Lower Abrams Creek (Blount Co.). The leaves are cordate or broadly rounded at the base and sharply serrate.

Acalypha rhomboidea Raf. Three-seeded mercury. Occasional, disturbed ground, roadsides, low elevations, throughout.

Acalypha virginica L. Virginia three-seeded Mercury. Rare, dry woods and roadsides, low elevations, western GRSM (Blount Co.).

Euphorbia (Gen. 4498)

Euphorbia apocynifolium Small. Spurge. Rare, dry woods, low elevations. Collected only near the mouth of Abrams Creek (Blount Co.) (PSW). (Included in *E. corollata* L. in R).

Euphorbia corollata L. Flowering spurge. Frequent, dry woods, low to mid-elevations, throughout.

Euphorbia maculata L. Nodding spurge. Occasional, disturbed ground, roadsides, low elevations.

Euphorbia purpurea (Raf.) Fernald. Purple spurge. Rare, dry woods, mid-elevation. Collected only on Hyatt Ridge (Swain Co.; J. Dan Pittillo collection, Western Carolina University herbarium).

Euphorbia supina Raf. Milk-purslane. Occasional, disturbed ground, shores, roadsides, sidewalks, low elevations. (Hoffman 1966b).

Phyllanthus (Gen. 4299)

Phyllanthus caroliniensis Walter. *Phyllanthus*. Rare, shore of sinkhole pond, Cades Cove (Blount Co.) (PSW).

FABACEAE (Leguminosae; Fam. 83)

Albizzia (Gen. 3433)

**Albizzia julibrissin* Durrazzini. Mimosa. Frequent, disturbed sites, roadsides, low elevations. Introduced from E. Asia.

Amorpha (Gen. 3707)

Amorpha fruticosa L. False indigo. Infrequent, moist thickets, low elevations, throughout. (Including *Amorpha fruticosa* var. *tennesseensis* (Shuttlew.) Palmer and *A. cynostachya* M. A. Curtis).

Amorpha glabra Desf. Smooth false indigo. Scarce, moist thickets, low elevations. The collections are from Haywood County.

Amphicarpa (Gen. 3860)

Amphicarpa bracteata (L.) Fern. Hog-peanut. Common, moist woods and thickets, low to mid-elevations, throughout. No specimens of *Amphicarpa bracteata* var. *comosa* (L.) Fern. have been seen from the park, although Hoffman listed this variety.

Apios (Gen. 3874)

Apios americana Medic. Ground-nut. Frequent, moist woods and thickets, low elevations, throughout.

Astragalus (Gen. 3766)

Astragalus canadensis var. *carolinianus* (L.) Jones. Milk-vetch. Scarce, dry woods, low to mid-elevations. Collected only from the North Carolina side of the park (Haywood, Swain Cos.). (Included in *A. canadensis* L. in R).

Baptisia (Gen. 3618)

Baptisia tinctoria (L.) R. Br. Wild indigo. Occasional, dry woods, low to mid-elevations, throughout. (Including *Baptisia tinctoria* var. *crebra* Fern.).

Cassia (Gen. 3536)

Cassia fasciculata Michx. Partridge-pea. Occasional, fields, roadsides, low elevations. The collections are from Cades Cove area (Blount Co.) and Swain County.

Cassia marilandica L. Wild senna. Occasional, old fields, thickets, low elevations, throughout.

Cassia nictitans L. Sensitive-pea. Frequent, fields, roadsides, low elevations, throughout.

Centrosema (Gen. 3858)

Centrosema virginianum (L.) Benth. Butterfly-pea. Scarce, dry woods, low elevations. Two collections: Lower Abrams Creek (Sharp S-299 at TENN and GRSM) and Swain County (Beardslee and Kofoed, unnumbered, at TENN).

FABACEAE (Cont.)

Cercis (Gen. 3526)

Cercis canadensis L. Redbud. Occasional, woods, thickets, roadsides, low elevations.

Cladrastis (Gen. 3606)

Cladrastis kentukea (Dum.-Cours) Rudd. Yellowwood. Occasional, moist rocky woods, low to mid-elevations, throughout. (*C. lutea* (Michx. f.) K. Koch.)

Clitoria (Gen. 3857)

Clitoria mariana L. Butterfly-pea. Occasional, dry woods, thickets, low elevations, probably throughout but collected from western GRSM (Blount and Sevier Cos.).

Coronilla (Gen. 3774)

**Coronilla varia* L. Crown-vetch. Scarce, roadsides, low elevations. Collected from Sugarlands area (Sevier Co.) (Hoffman 1966b). Native to Europe.

Crotalaria (Gen. 3669)

Crotalaria purshii DC. Pursh's rattlebox. Very rare; the only park locale (and only Tennessee station) is in the vicinity of the mouth of Abrams Creek (Blount Co.). (*C. sagittalis* L. in Hoffman 1964). It has not been seen since first collected by Jack Sharp in 1934; this is a coastal plain species.

Cytisus (Gen. 3682)

**Cytisus scoparius* (L.) Link. Scotch-broom. Rare, persistent after cultivation, edge of Newfound Gap parking lot. Native to Europe.

Desmodium (Gen. 3807)

Desmodium ciliare (Muhl. ex Willd.) DC. Small-leaved tick-trefoil. Frequent, dry woods, thickets, low elevations, throughout.

Desmodium glutinosum (Muhl. ex Willd.) Wood. Whorled tick-trefoil. Common, submesic to subxeric woods, low to mid-elevations, throughout.

Desmodium laevigatum (Nutt.) DC. Smooth tick-trefoil. Infrequent, dry woods, low elevations, western GRSM (Blount Co.).

Desmodium marilandicum (L.) DC. Narrow tick-trefoil. Frequent, fields, thickets, dry woods, low to mid-elevations, throughout.

Desmodium nudiflorum (L.) DC. Naked-flowered tick-trefoil. Common, submesic to subxeric woods, low to mid-elevations, throughout.

Desmodium nuttallii (Schindler) Schubert. Nuttall's tick-trefoil. Scarce, limestone woods, low elevations. White Oak Sink (Blount Co.) (PSW).

Desmodium paniculatum (L.) DC. var. *paniculatum*. Panicked tick-trefoil. Frequent, fields, roadsides, thickets, low to mid-elevations, throughout. (Including specimens referred to *D. canescens* (L.) DC by Hoffman).

FABACEAE (Cont.)

- Desmodium paniculatum* var. *dillenii* (Darl.) Isley. Hairy panicled tick-trefoil. Occasional with the typical less hairy) variety.
- Desmodium paucifolium* (Nutt.) DC. Leafy tick-trefoil. Rare, rich woods, low elevations. Lower Abrams Creek, Blount County (White 2227 at GRSM) (PSW).
- Desmodium rotundifolium* DC. Prostrate tick-trefoil. Occasional, dry woods, low elevations, probably throughout but collected from Blount and Swain Counties.
- Desmodium viridiflorum* (L.) DC. Tick-trefoil. Rare, dry woods, low elevations. Lower Abrams Creek, Blount County (Sharp and Veloira 20979 at TENN; White 2227 at GRSM).

Gleditsia (Gen. 3544)

- Gleditsia triacanthos* L. Honeylocust. Scarce, woods, old fields, low elevations, throughout (Blount, Sevier, Swain Cos.).

Gymnocladus (Gen. 3545)

- **Gymnocladus dioica* (L.) K. Koch. Kentucky coffee-tree. Rare; persistent at an old homesite, near Abrams Creek campground (see Stupka 1964), low elevation. Native to eastern and midwestern U.S.

Lathyrus (Gen. 3854)

- **Lathyrus latifolius* L. Everlasting pea. Scarce, fields and roadsides, low elevations. Collected from Sevier County. Native to Europe.
- Lathyrus venosus* var. *intonsus* Butt. & St. John. Wild pea. Scarce, submesic woods, low to mid-elevations. Collected from Blount and Haywood Counties. (Included in *L. venosus* Muhl. ex Willd. in R).

Lespedeza (Gen. 3820)

- **Lespedeza bicolor* Turcz. Japanese lespedeza. Rare introduction, roadsides, low elevations. Along Gatlinburg bypass just inside GRSM (Sevier Co.). (PSW). Native to Asia.
- Lespedeza capitata* Michx. Round-headed bush-clover. Rare, dry woods and thickets, low elevations. Cades Cove (Blount Co.; Jennison 3539 at TENN and GRSM).
- **Lespedeza cuneata* (Dumont) G. Don. Cuneate bush-clover. Frequent, roadsides, low to mid-elevations, throughout. Native to E. Asia.
- Lespedeza hirta* (L.) Hornem. Hairy bush-clover. Occasional, dry woods and thickets, low to mid-elevations, throughout.
- Lespedeza intermedia* (S. Wats.) Britt. Wandlike bush-clover. Frequent, roadsides, trailsides, low to mid-elevations, throughout.
- Lespedeza procumbens* Michx. Low bush-clover. Scarce, roadsides, low elevations. Cades Cove (Blount Co.). (PSW).
- Lespedeza repens* (L.) Bart. Trailing bush-clover. Occasional, roadsides, low elevations. Collected from Blount and Sevier Counties.
- **Lespedeza stipulacea* Maxim. Korean bush-clover. Occasional, roadsides, low elevations. Collected from Sevier County. Native to E. Asia.
- **Lespedeza striata* (Thunb.) H. & A. Japanese clover. Occasional, roadsides, low elevations. Collected from Sevier County. Native to E. Asia.

FABACEAE (Cont.)

Lepedeza violacea (L.) Pers. Bush-clover. Scarce, roadsides, thickets, low elevations. Collected from Blount County.

Lespedeza virginica (L.) Britt. Slender bush-clover. Scarce, dry woods and thickets, low to mid-elevations. Collected from Blount and Sevier Counties.

Medicago (Gen. 3866)

**Medicago lupulina* L. Black medick. Scarce, roadsides, low elevations. Collected near Elkmont (Sevier Co.). (PSW). Native to Europe.

Melilotus (Gen. 3689)

**Melilotus alba* Desr. White sweet-clover. Occasional, disturbed soil along roads, low elevations. Native to Europe.

**Melilotus officinalis* (L.) Lam. Yellow sweet-clover. Occasional, disturbed soil along roads, low elevations. Native to Europe.

Phaseolus (Gen. 3901)

Phaseolus polystachios (L.) BSP. Wild bean. Scarce, thickets, low elevations (Blount, Sevier Cos.).

Psoralea (Gen. 3703)

Psoralea psoralioides var. *eglandulosa* (Ell.) Freeman. Sampson's snakeroot. Scarce; known from two collections in Cades Cove (Blount Co., GRSM).

Pueraria (Gen. 3889)

**Pueraria lobata* (Willd.) Ohwi. Kudzu. Scarce; in GRSM, persistent and spreading (unless regularly sprayed with herbicide) at old homesites, low elevations. (Blount and Swain Cos.). Native to E. Asia.

Rhynchosia (Gen. 3897)

Rhynchosia tomentosa (L.) H. & A. Hairy rhynchosia. Scarce, dry woods, low elevations. Lower Abrams Creek area (Blount Co.).

Robinia (Gen. 3733)

Robinia boyntonii Ashe. Boynton's locust. Scarce, dry woods, mid-elevations. One collection at Sugarland Mountain (Sevier Co.).

Robinia hispida L. Bristly locust. Infrequent, dry woods, low to mid-elevations. Very variable, the taxonomy not yet fully worked out (including *R. grandiflora* of Hoffman and Stupka).

Robinia kelseyi Hutchinson. Kelsey's locust. Scarce, dry woods, mid-elevations. Collected in Greenbrier (Sevier Co.) and Cataloochee Valley (Haywood Co.).

Robinia pseudo-acacia L. Black locust. Common, old fields and submesic woods, low to mid-elevations.

FABACEAE (Cont.)

Schrankia (Gen. 3448)

Schrankia microphylla (Solander ex Smith) Macbr. Sensitive-brier, catclaw. Scarce, presently known from the Lower Abrams Creek area (Blount Co.) and dry slopes above Lake Fontana (Swain Co.).

Strophostyles (Gen. 3901)

Strophostyles umbellata (Muhl. ex Willd.) Britt. Wild-bean. Occasional, dry woods, roadsides, low elevations. Lower Abrams Creek area (Blount Co.).

Stylosanthes (Gen. 3802)

Stylosanthes biflora (L.) BSP. Pencil flower. Occasional, trailsides, dry woods, low elevations, throughout. (Including *S. riparia* Kearney of Hoffman (1966b)).

Tephrosia (Gen. 3718)

Tephrosia spicata (Walt.) T. & G. Spike goat's rue. Scarce, dry woods, two collections (Lower Abrams Creek, Blount Co.; Pine Ridge, Sevier Co.).

Tephrosia virginiana (L.) Pers. Goat's rue. Frequent, dry woods, trailsides, low to mid-elevations, throughout.

Thermopsis (Gen. 3617)

Thermopsis mollis (Michx.) M. A. Curtis ex Gray. Soft bush-pea. Scarce, dry woods, low to mid-elevations. The only station within GRSM is along Bunker Hill lead, Blount County (Jennison and Fleetwood 1861, at GRSM).

Thermopsis villosa (Walter) Fern. & Schubert. Hairy bush-pea. Occasional, dry woods, low to mid-elevations. All the collections are from Swain County except one from Blount County. (*T. caroliniana* M. A. Curtis).

Trifolium (Gen. 3690)

**Trifolium agrarium* L. Yellow or hop-clover. Scarce, fields, low elevations. Collected from Big Creek (Haywood Co.) and Tow String Road (Swain Co.). (PSW). Native to Europe.

**Trifolium campestre* Schreb. Low hop-clover. Occasional, roadsides, fields, low elevations. Collected from Blount and Sevier Counties. Native to Europe. (*T. procumbens* L.).

**Trifolium dubium* Sibthorp. Smaller hop-clover. Scarce, roadsides, low elevations. Elkmont (Sevier Co.). (PSW). Native to Europe.

**Trifolium hybridum* L. Alsike clover. Frequent, fields, roadsides, low to mid-elevations, throughout. One collection bears a 10-ribbed calyx (Jennison 2452 at GRSM). However, it is certainly typical *T. hybridum* in all other respects. Native to Europe.

**Trifolium incarnatum* L. Crimson clover. Scarce, roadsides, low elevations. Collected from Swain County. Native to Europe. (Including *Trifolium incarnatum* var. *elatius* Gibelli & Belli).

**Trifolium pratense* L. Red clover. Common, fields, roadsides, low to mid-elevations, throughout. Native to Europe.

FABACEAE (Cont.)

- **Trifolium repens* L. White clover. Common, fields, roadsides, low to mid-elevations, throughout. Native to Europe.

Vicia (Gen. 3852)

- **Vicia angustifolia* Reichard. Common vetch. Scarce, roadsides, low elevations. Lower Abrams Creek (Blount Co.) and Sugarlands area (Sevier Co.) (PSW). Native to Europe.
- Vicia caroliniana* Walt. Carolina vetch. Frequent, submesic to subxeric woods, roadsides, low to mid-elevations, throughout.
- **Vicia dasycarpa* Tenore. Blue vetch. Rare, roadsides, low elevations. Known only from Cades Cove (Blount Co.) (PSW). Native to Europe.
- **Vicia villosa* Roth. Hairy vetch. Scarce, roadsides, low elevations. The only collection (Jennison 4209) is from Elkmont (Sevier Co.). Native to Europe.

Wisteria (Gen. 3722)

- Wisteria frutescens* (L.) Poir. *Wisteria*. Scarce, streamside thickets and old homesites, low elevations. Collected from Blount and Sevier Counties. (Including *Wisteria macrostachya* Nutt. of Hoffman's list). Some locales for this species may be the result of plantings or seed dispersal from cultivated individuals.

FAGACEAE (Fam. 46)

Castanea (Gen. 1891)

- Castanea dentata* (Marsh.) Borkh. American chestnut. Before the chestnut blight, a major forest dominant in submesic stands. Root sprouts (occasionally surviving to ca 20 cm in diameter and flowering) are frequent throughout, except at the highest elevations.
- **Castanea mollissima* Bl. Chinese chestnut. Rare, persistent after cultivation and escaped, near old homesites and developed areas (Cades Cove and Twin Creeks - Blount and Sevier Cos.). (Not in R).
- Castanea pumila* (L.) Mill. Allegheny chinkapin. Rare and perhaps extirpated, dry woods, low to mid-elevations (Near Smokemont, Swain Co.) and Mt. Sterling, Haywood Co.).

Fagus (Gen. 1890)

- Fagus grandifolia* Ehrh. American beech. Common, mesic woods, throughout, but most common in mid- to upper elevation northern hardwood forest. Trees with thicker, less deeply toothed leaves have been segregated as *Fagus grandifolia* var. *caroliniana* (Loud.) Fern.

Quercus (Gen. 1893)

- Quercus alba* L. White oak. Common, submesic woods, throughout, except the highest elevations. Including *Q. alba* var. *latiloba* Sarg. of Hoffman (1964).

FAGACEAE (Cont.)

- Quercus coccinea* Muenchh. Scarlet oak. Common, dry woods (e.g., pine-oak forest), low to mid-elevations, throughout.
- Quercus falcata* Michx. Southern red oak. Frequent, dry woods, old fields, low elevations.
- Quercus imbricaria* Michx. Shingle oak. Scarce, streamside woods at low elevations (Blount and Swain Cos.).
- Quercus marilandica* Muenchh. Blackjack oak. Infrequent, dry woods, low elevations--most common in the Lower Abrams Creek area.
- Quercus muhlenbergii* Engelm. Chinkapin oak. Scarce, submesic woods, mostly over limestone (Cades Cove, Rich Mt. Gap, White Oak Sink, Lower Abrams Creek area) (Blount Co.). Trees with broad, obovate leaves have been segregated as *Quercus muhlenbergii* f. *alexanderi* (Britt.) Trel. A specimen of this tree was erroneously called *Q. bicolor* in Stupka (1964).
- Quercus prinus* L. Chestnut oak. Common, submesic to xeric, often rocky, woods, low to mid-elevations.
- Quercus rubra* L. Northern red oak. Common in mesic to submesic woods, throughout, except at the highest elevations.
- Quercus stellata* Wang. Post oak. Infrequent, dry woods, mostly at low elevations (frequent in the Cades Cove area).
- Quercus velutina* Lam. Black oak. Common, dry woods, low to mid-elevations.

FUMARIACEAE (Fam. 71A)

Adlumia (Gen. 2857)

- Adlumia fungosa* (Ait.) Greene. Climbing fumitory. Scarce, mesic to xeric rocky woods, low to mid-elevations. Scattered locales throughout the park. A. J. Sharp feels that it is less common than formerly.

Corydalis (Gen. 2858)

- Corydalis sempervirens* (L.) Pers. Pale corydalis. Rare, rock outcrops, mid-elevations (near Mt. Sterling and Steel Trap Branch--Haywood and Swain Cos.).

Dicentra (Gen. 2856)

- Dicentra cucullaria* (L.) Bernh. Dutchman's britches. Common, rich rocky woods, throughout.
- Dicentra canadensis* (Goldie) Walp. Squirrel corn. Frequent, rich rocky woods, throughout.
- Dicentra eximia* (Ker) Torr. Bleeding heart. Scattered populations, usually in moist, rocky woods or along streams, low to mid-elevations.

GENTIANACEAE (Fam. 143)

Bartonia (Gen. 6501)

- Bartonia virginica* (L.) BSP. Bartonia. Scarce, but easily overlooked, low to high elevations, throughout. Known from Gregory Bald, Andrews Bald, an old cemetery, and a lawn.

GENTIANACEAE (Fam. 143)

Gentiana (Gen. 6509)

- Gentiana decora* Pollard. Mountain gentian. Frequent, submesic to subxeric woods, thickets, low to mid-elevations, throughout.
- Gentiana linearis* Froel. Linear-leaved gentian. Rare, seeps, landslide scars, cliffs, high elevations. Mt. LeConte only (Sevier Co.). Disjunct from West Virginia. (Not in R).
- Gentiana quinquefolia* L. Stiff gentian. Occasional, submesic woods, thickets, roadsides, low to high elevations, throughout, but perhaps most conspicuous on the North Carolina side.
- Gentiana saponaria* L. Soap gentian. Rare, streamside thicket, low elevation, Lower Abrams Creek area (Blount Co.) (PSW).
- Gentiana villosa* L. Hairy gentian. Rare, streamside thicket, low elevation, Lower Abrams Creek area (Blount Co.) (PSW).

Obolaria (Gen. 6502)

- Obolaria virginica* L. Pennywort. Occasional and easily overlooked, mesic woods and thickets, low elevations. The collections are all from Blount County.

Sabatia (Gen. 6494)

- Sabatia angularis* (L.) Pursh. Rose-pink. Occasional, moist to dry roadsides, thickets, fields, low elevations, throughout.
- Sabatia campanulata* (L.) Torr. Campanulate sabatia. Very rare, seepage area in young woods, low elevations. Known from one site in Cades Cove (Blount Co.); a coastal plain species.

Swertia (Gen. 6512)

- Swertia caroliniensis* (Walter) Kuntze. American columbo. Rare, limestone woods, low elevations. Known only from the vicinity of an old quarry, Cades Cove (Blount Co.) (PSW).

GERANIACEAE (Fam. 86)

Erodium (Gen. 3927)

- **Erodium cicutarium* (L.) Her. Pin-clover. Scarce, fields, low elevations. Collected from Swain County only (Jennison 4136 at GRSM and TENN). Native to Europe.

Geranium (Gen. 3924)

- Geranium carolinianum* L. Carolina cranesbill. Occasional, roadsides, fields, low to mid-elevations, throughout.
- **Geranium columbinum* L. Long-stalked cranesbill. Rare, old homesites, roadsides, low elevations. Collected from Haywood County (Jennison and Fleetwood 1940 at TENN). Native to Europe.

GERANIACEAE (Cont.)

Geranium maculatum L. Wild geranium. Common, moist woods, coves, low to mid-elevations, throughout.

**Geranium molle* L. Dovesfoot cranesbill. Rare or overlooked, roadsides, trailsides, mid-elevations. Collected near Cove Creek Gap (Haywood Co.). (PSW). Native to Europe.

GUTTIFERAE (See. HYPERICACEAE)

HAMAMELIDACEAE (Fam. 80)

Hamamelis (Gen. 3309)

Hamamelis virginiana L. Witch-hazel. Common, mesic to submesic woods and thickets, low to mid-elevations.

Liquidambar (Gen. 3298)

Liquidambar styraciflua L. Sweetgum. Common, mesic woods, old fields, streamsides, mostly at the lower elevations (to 2,500 ft).

HIPPOCASTANACEAE (Fam. 103)

Aesculus (Gen. 4721)

Aesculus octandra Marsh. Yellow buckeye. Common, rich moist woods, throughout, except at the highest elevations. *Aesculus glabra* has been found near GRSM in Blount Co.; it is to be looked for in the western part of the park.

HYDROPHYLLACEAE (Fam. 148)

Hydrophyllum (Gen. 7021)

Hydrophyllum canadense L. Canadian waterleaf. Common, moist rocky woods, low to mid-elevations, throughout.

Hydrophyllum macrophyllum Nuttall. Bigleaf waterleaf. Rare, thickets, low elevation, White Oak Sink (Blount Co.) (PSW).

Hydrophyllum virginianum var. *atranthum* (E. J. Alex.) Constance. Virginia waterleaf. Occasional, moist woods (northern hardwood coves) at mid- to upper elevations, throughout. (The variety is not listed in R).

Phacelia (Gen. 7025)

Phacelia bipinnatifida Michx. var. *bipinnatifida*. Purple phacelia. Occasional, rocky woods, low to mid-elevations, throughout.

Phacelia bipinnatifida var. *plummeri* Wood. This variety has a smaller corolla (6-8 mm broad) than the typical variety (10-15 mm broad), and the stamens and style are not exerted (exert in the typical variety). (Not in R).

Phacelia dubia (L.) Trel. Small-flowered phacelia. Scarce, moist woods, low elevations. The only collections are from Swain Co. (NCU and Tom Patrick).

Phacelia fimbriata Michx. Fringed phacelia. Common, moist woods, mid- to high elevations, throughout.

HYDROPHYLLACEAE (Cont.)

Phacelia purshii Buckl. Pursh's purple phacelia. Occasional, moist thickets, roadsides, old fields, low elevations.

HYPERICACEAE (Guttiferae; Fam. 111)

Ascyrum (Gen. 5167)

Ascyrum hypericoides L. var. *hypericoides*. St. Andrew's cross. Occasional, moist woods, streamsides, low elevations, throughout. An erect shrub .3 to 1 m tall; apparently less frequent than the following variety. (*Hypericum hypericoides* (L.) Crantz in R).

Ascyrum hypericoides var. *multicaule* (Michx.) Fern. Low St. Andrews's cross. Frequent, moist woods, streambanks, throughout. Some stems prostrate, plant .1 to .5 m tall. (*H. stragalum* P. Adams & Robson. in R).

Hypericum (Gen. 5168)

Hypericum densiflorum Pursh. Shrubby St. John's-wort. Rare, fields, low elevations. Collected from near Sugarlands Visitor Center (Sevier Co.) (PSW).

Hypericum gentianoides (L.) BSP. Pineweed. Infrequent, fields, thickets, dry banks, low elevations, probably throughout but collected from Blount and Swain Counties.

Hypericum graveolens Buckley. Mountain St. John's-wort. Occasional, balds, thickets, cliffs, seeps, high elevations, vicinity of Double Springs Gap eastward along the high ridge. Similar to *H. mitchellianum* Rydb. but the styles are over 4 mm long (less than or equal to 4 mm long in *H. mitchellianum*).

Hypericum mitchellianum Rydb. Mitchell's St. John's-wort. Occasional, balds, fields, open woods, mid- to high elevations, throughout.

Hypericum mutilum L. Dwarf St. John's-wort. Frequent, streamsides, seeps, wet meadows, low to high elevations, throughout. (Including *Hypericum mutilum* var. *parviflorum* (Willd.) Fern.).

**Hypericum perforatum* L. Common St. John's-wort. Occasional, fields, roadsides, low elevations. Collected from Blount and Sevier Counties. Native to Europe.

Hypericum pseudomaculatum Bush. St. John's-wort. Occasional, dry slopes, roadsides, low to mid-elevations, throughout. Very close to *H. punctatum* Lam., but the upper leaves are deltoid and acute (all leaves oblong and blunt in *H. punctatum*). (*H. punctatum* var. *pseudomaculatum* (Bush) Fern.).

Hypericum punctatum Lam. Dotted St. John's-wort. Frequent, fields, roadsides, balds, low to high elevations, throughout.

JUGLANDACEAE (Fam. 44)

Carya (Gen. 1882)

Carya cordiformis (Wang.) K. Koch. Bitternut hickory. Frequent, rich woods, low to mid-elevations.

Carya glabra (Mill.) Sweet. Pignut hickory. Common, submesic to xeric woods, low to mid-elevations.

**Carya illinoensis* (Wang.) Koch. Pecan. Rare, persistent in Sugarlands valley after cultivation (Sevier Co.). Native to the midwestern U.S.

JUGLANDACEAE (Cont.)

Carya ovalis (Wang.) Sarg. Sweet pignut hickory. Infrequent, submesic to subxeric woods, scattered throughout. Frequent on the limestone slopes of the White Oak Sink and Rich Mountain Gap. This species is close to *C. glabra*. The following sterile key was developed from GRSM specimens:

Bark not becoming shaggy; leaflets 5, rarely 7, rachis and petiole green; terminal buds narrowly ovate-lanceolate, scales tight, not dotted, or if so, dots inconspicuous.... *C. glabra*.

Bark becoming shaggy; leaflets 7 or 5 and 7, rachis and petiole (sometimes only petiole base) red or red-tinged; terminal buds ovate, scale tips spreading, scales yellow-dotted *C. ovalis*.

Carya ovata (Mill.) K. Koch. Shagbark hickory. Scarce, limestone areas (Blount Co.) and Roaring Fork Motor Nature Trail (Sevier Co.).

Carya pallida (Ashe) Engl. & Graebn. Pale hickory. Scarce, dry woods, low elevations. This species is frequent on the dry ridges of the Lower Abrams Creek area.

Carya tomentosa Nutt. Mockernut hickory. Common, submesic to xeric woods, low to mid-elevations.

Juglans (Gen. 1881)

Juglans cinerea L. Butternut. Infrequent, rocky streamsides, low to mid-elevations.

**Juglans mandshurica* Maxim. Manchu walnut. Rare, persistent at old homesites (Cades Cove in Blount Co.; formerly in Sugarlands valley, Sevier Co.). Introduced from E. Asia. (Not in R).

Juglans nigra L. Black walnut. Frequent, old homesites, old fields, occasionally in woodlands, low to mid-elevations.

LABIATAE (See LAMIACEAE)

LAMIACEAE (Labiatae; Fam. 151)

Agastache (Gen. 7241)

Agastache scrophulariaefolia (Willd.) Ktze. Giant hyssop. Rare, moist thickets, mid-elevations. The only collections are from Swain Co., in the vicinity of Indian Creek and Deep Creek.

Ajuga (Gen. 7211)

**Ajuga reptans* L. Bugleweed. Rare introduction, old homesites, low elevations. Collected by Matt Hickler at Twin Creeks (Sevier Co.). Native to Europe.

Blephilia (Gen. 7297)

Blephilia hirsuta (Pursh) Benth. Woodmint. Frequent, mesic to submesic woods, low to mid-elevations, throughout.

LAMIACEAE (Cont.)

Collinsonia (Gen. 7331)

Collinsonia canadensis L. Stoneroot. Frequent, moist woods, low to mid-elevations, throughout. (Including *Collinsonia canadensis* var. *punctata* (Ell.) Gray).

Cunila (Gen. 7320)

Cunila origanoides (L.) Britt. Dittany. Occasional, dry woods, low elevations. Lower Abrams Creek area (Blount Co.).

Glechoma (Gen. 7249)

**Glechoma hederacea* L. Gill-over-the-ground. Frequent, lawns, roadsides, fields, low elevations, throughout. Native to Europe.

Hedeoma (Gen. 7302)

Hedeoma pulegioides (L.) Pers. American pennyroyal. Occasional, dry woods and thickets, low to mid-elevations. The collections are from Blount and Swain Counties.

Lamium (Gen. 7271)

**Lamium amplexicaule* L. Henbit. Frequent, fields and roadsides, low elevations, throughout. Native to Europe.

**Lamium purpureum* L. Purple dead-nettle. Occasional, fields and roadsides, low elevations, throughout. Native to Europe.

Leonurus (Gen. 7275)

**Leonurus cardiaca* L. Motherwort. Scarce, roadsides, thickets, low to mid-elevations. Collected from Cataloochee and Big Creek (Haywood Co.). Native to Europe.

Lycopus (Gen. 7326)

Lycopus americanus Muhl. ex Barton. American bugleweed. Occasional, streamsides, low elevations. Collected from Chestnut Branch, Haywood County (Bain and Jennison 1152 at GRSM and TENN).

Lycopus uniflorus Michx. Bugleweed. Occasional, wet ground, low elevations. Collected from Bryson Place, Swain County (Jennison 762 at GRSM and TENN).

Lycopus virginicus L. Virginia water-horehound. Frequent, wet meadows, streamsides, seeps, low elevations, throughout. Some plants placed here in *L. virginicus* L. have been referred to *L. x sherardi* Steele (a hybrid of *L. virginicus* and *L. uniflorus* Michx.).

Melissa (Gen. 7304)

**Melissa officinalis* L. Common balm. Rare, old homesites, low elevations. Cades Cove (Blount Co.). Native to Europe.

LAMIACEAE (Cont.)

Mentha (Gen. 7328)

- **Mentha piperita* L. Peppermint. Occasional, wet meadows, streamsides, low elevations, throughout. Native to Europe.
- **Mentha spicata* L. Spearmint. Infrequent, wet meadows, streamsides, low elevations. Collected from western GRSM (Blount Co.). Native to Europe.

Monarda (Gen. 7296)

- Monarda clinopodia* L. Horse-mint. Frequent, rich moist woods, low to high elevations, throughout. The flowers are white to pink.
- Monarda didyma* L. Bee-balm. Frequent, rich moist woods, seeps, low to high elevations, throughout. The flowers are red.
- Monarda fistulosa* L. Wild bergamot. Frequent, moist woods, thickets, low to mid-elevations, throughout. The only species of *Monarda* in our flora with a conspicuous tuft of trichomes on the apex of the upper lip of the corolla.
- Monarda media* Willd. Purple bee-balm. Occasional, moist woods, seeps, low to middle elevations, throughout. Probably a hybrid of *M. clinopodia* L. and *M. didyma* L.

Nepeta (Gen. 7247)

- **Nepeta cataria* L. Catnip. Scarce, pastures, old homesites. The single collection is from a mid-elevation site, Swain County. Native to Europe.

Perilla (Gen. 7332)

- **Perilla frutescens* (L.) Britt. Beefsteak plant. Occasional, roadsides, trailsides, low to mid-elevations, throughout. Native to Asia.

Physostegia (Gen. 7257)

- Physostegia virginiana* (L.) Benth. False dragonhead. Infrequent, dry limestone woods and streamsides, low elevations, western GRSM (Blount Co.). (*Dracocephalum virginianum* L. in R).

Prunella (Gen. 7204)

- Prunella vulgaris* L. Heal-all. Frequent, moist fields, thickets, trailsides, streamsides, low to high elevations, throughout. Native, at least in part. (Including *Prunella vulgaris* var. *lanceolata* (Bart.) Fern.).

Pycnanthemum (Gen. 7317)

- Pycnanthemum incanum* var. *loomisii* (Nutt.) Fern. Hoary mountain-mint. Occasional, open woods, thickets, low to mid-elevations, throughout. (Included in *P. incanum* (L.) Michx. in R). A number of collections placed in *P. incanum* var. *loomisii* here, have been placed in *P. pycnanthemoides* Fern. by others. The only characters I have seen to separate these taxa are inconsistent in the specimens I have seen. I have, therefore, tentatively placed them all in *P. incanum* var. *loomisii*.

LAMIACEAE (Cont.)

Pycnanthemum montanum Michx. Mountain-mint. Frequent, submesic to subxeric woods, thickets, low to mid-elevations, throughout.

Pycnanthemum muticum (Michx.) Pers. Silvery mountain-mint. Occasional, fields, roadsides, low elevations, probably throughout but collected from Blount County.

Pycnanthemum tenuifolium Schrader. Narrow-leaved mountain-mint. Occasional, fields, roadsides, low elevations, throughout. (*P. flexuosum* (Walt.) BSP of Hoffman's list).

Salvia (Gen. 7290)

Salvia lyrata L. Lyre-leaved sage. Frequent, roadsides, fields, low to mid-elevations, throughout.

Satureja (Gen. 7305)

**Satureja vulgaris* (L.) Fritsch Basil. Occasional, fields and roadsides, low elevations, throughout. Native to Europe. (Including *Satureja vulgaris* var. *neogaea* Fern.).

Scutellaria (Gen. 7234)

Scutellaria elliptica var. *hirsuta* (Short) Fern. Hairy skullcap. Occasional, dry woods, low elevations, throughout. (Included in *S. elliptica* Muhl. in R).

Scutellaria incana Biehler. Downy skullcap. Occasional, moist to dry woods, thickets, low to mid-elevations, throughout. (Including *Scutellaria incana* var. *punctata* (Chapm.) Mohr.).

Scutellaria integrifolia L. Entire-leaved skullcap. Occasional, woods, thickets, low to mid-elevations, probably throughout but collected from Sevier County.

Scutellaria lateriflora L. Mad-dog skullcap. Occasional, marshes, streamsides, low to mid-elevations, western GRSM (Blount Co.).

Scutellaria ovata Hill. Heart-leaved skullcap. Scarce, dry woods, thickets, low to mid-elevations. Lower Abrams Creek (Blount Co.) and Jump-Up Ridge (Swain Co.). (Including *Scutellaria ovata* var. *venosa* Epl. and *Scutellaria ovata* var. *versicolor* (Nutt.) Fern.).

Stachys (Gen. 7281)

Stachys clingmanii Small. Clingman's hedge-nettle. Frequent, moist woods and thickets, mid- to high elevations, throughout.

Stachys latidens Small. Rough hedge-nettle. Occasional, moist woods and thickets, low to mid-elevations, throughout. Similar to *S. riddellii* House but glabrate, and upper internodes lack stipitate glands. (Including *S. tenuifolia* var. *hispida* (Pursh) Fern. of Hoffman; *S. tenuifolia* var. *latidens* (Small) Nelson).

Stachys riddellii House. Hairy hedge-nettle. Frequent, moist thickets, low to mid-elevations, throughout. (Including *S. salvioides* Small of Hoffman's list). (This taxon is not in R; plants determined here key to *S. nuttallii* Shuttlew. in that manual). The upper internodes bear stipitate glands and the petioles are hairy.

LAMIACEAE (Cont.)

Synandra (Gen. 7259)

Synandra hispidula (Michx.) Baillon. *Synandra*. Scarce, rich moist woods, low elevations. Collected from Ela (Swain Co.) and White Oak Sink (Blount Co.). (See Chester 1975).

Teucrium (Gen. 7212)

Teucrium canadense var. *virginicum* (L.) Eat. Wood-sage. Scarce, dry woods, thickets, low elevations, western GRSM (Blount Co.). Included in *T. canadense* L. in R).

Trichostema (Gen. 7218)

Trichostema dichotomum L. Bluecurls. Infrequent, fields, dry woods, low to mid-elevations, throughout.

LAURACEAE (Fam. 70)

Lindera (Gen. 2821)

Lindera benzoin (L.) Blume. Spicebush. Common, mesic woods, especially near streams, low to mid-elevations, throughout.

Sassafras (Gen. 2795)

Sassafras albidum (Nutt.) Nees. *Sassafras*. Common, submesic to xeric woods, low to mid elevations, throughout.

LINACEAE (Fam. 84)

Linum (Gen. 3945)

Linum striatum Walt. Yellow flax. Scarce, meadows, moist fields, low elevations. The collections are from Blount and Sevier Counties.

Linum virginianum L. Virginia flax. Occasional, dry woods, trailsides, low elevations. The collections are from Blount County.

LOGANIACEAE (Fam. 142)

Spigelia (Gen. 6453)

Spigelia marilandica L. Indian pink. Scarce, woods and thickets on limestone slopes, low elevations, western GRSM (Blount Co.). Conspicuous and frequent near Rich Mountain Gap and in parts of White Oak Sink.

LORANTHACEAE (Fam. 52)

Phoradendron (Gen. 2089)

Phoradendron flavescens (Pursh) Nutt. American mistletoe. Occasional, submesic to xeric woods, low to mid-elevations. Probably much overlooked (underlooked would, perhaps, be a better term); conspicuous only in the winter. A parasite on the branches of deciduous trees. (P. serotinum (Raf.) M. C. Johnston in R).

LYTHRACEAE (Fam. 121)

Cuphea (Gen. 5478)

Cuphea petiolata (L.) Koehne. Clammy cuphea. Rare, roadside, low elevation. The only GRSM collection is from Garland Ridge (Blount Co.). (C. viscosissima Jacquin in R).

Rotala (Gen. 5473)

Rotala ramosior (L.) Koehne. Rotala. Rare, sinkhole pond in Cades Cove (Blount Co. only) (PSW). (See Chester 1975).

MAGNOLIACEAE (Fam. 67)

Liriodendron (Gen. 2654)

Liriodendron tulipifera L. Tuliptree, yellow poplar. Common, old fields, rich moist woods, cove hardwoods, low to mid-elevations, throughout.

Magnolia (Gen. 2651)

Magnolia acuminata L. Cucumber-tree. Frequent, mesic to submesic woods, low to mid-elevations, throughout. Trees with yellow flowers have been segregated as Magnolia acuminata f. aurea (Ashe) Hardin. They are occasional, and distinctive in bloom, in GRSM.

Magnolia fraseri Walt. Fraser magnolia. Common, mesic to submesic woods, low to mid-elevations, throughout.

*Magnolia grandiflora L. Very rare, persistent at an old homesite, low elevation (Sevier Co.). Native to the Southeastern U.S. coastal plain. (GRSM).

Magnolia macrophylla Michx. Big-leaved magnolia. Rare, mesic slope forests, low elevations. Beard Cane Creek and Hesse Creek (Blount Co.) (PSW).

Magnolia tripetala L. Umbrella magnolia. Common, streamside, forests, low to mid-elevations, throughout.

MALVACEAE (Fam. 109)

Hibiscus (Gen. 5013)

Hibiscus moscheutos L. Swamp mallow. Scarce, old homesites, wet meadows, low elevations. Collected from Blount and Sevier Counties.

MALVACEAE (Cont.)

- **Hibiscus syriacus* L. Rose-of-Sharon, shrubby althea. Scarce, persistent at old homesites, low elevations. Native to Asia.

Malva (Gen. 4992)

- **Malva neglecta* Wallr. Common mallow. Scarce, fields, roadsides, low to mid-elevations. Collected from Swain County.
- **Malva sylvestris* L. High mallow. Scarce, fields, old homesites, low elevations. Collected from Cades Cove (Blount Co.). Native to Europe.

Sida (Gen. 4998)

- **Sida spinosa* L. Prickly mallow, infrequent, roadsides, low elevations. Collected from Blount and Sevier Counties. Native to the American tropics.

MELASTOMATACEAE (Fam. 123)

Rhexia (Gen. 5664)

- Rhexia mariana* L. Pale meadow beauty. Scarce, wet meadows, shores, and thickets, low to mid-elevations (Blount, Cocke, Swain Cos.).
- Rhexia virginica* L. Meadow beauty. Scarce, wet meadows, shores, and thickets, low to mid-elevations (Blount, Swain Cos.).

MENISPERMACEAE (Fam. 66)

Cocculus (Gen. 2570)

- Cocculus carolinus* (L.) DC. Snailseed or coralbead. Scarce, thickets and roadsides at low elevations (Blount Co.).

Menispermum (Gen. 2567)

- Menispermum canadense* L. Moonseed. Scarce, thickets and roadsides at low elevations (Blount Co.).

MORACEAE (Fam. 48)

Maclura (Gen. 1918)

- **Maclura pomifera* (Raf.) Schneid. Osage-orange. Scarce, persistent after cultivation at old homesites. Native in the SE only in a small area of Texas, Oklahoma, and Arkansas.

Morus (Gen. 1913)

- **Morus alba* L. White mulberry. Rare, persistent after cultivation. Introduced from Europe.
- Morus rubra* L. Red mulberry. Frequent, old homesites, thickets, mesic woods, low elevations, throughout.

NYCTAGINACEAE (Fam. 57)

Mirabilis (Gen. 2347)

**Mirabilis jalapa* L. Four-o'clock. Rare, persistent after cultivation, low to mid-elevations (two collections: Sevier Co.). Native to Tropical America.

NYMPHAEACEAE (Fam. 63)

Nuphar (Gen. 2514)

**Nuphar advena* (Ait.) Ait. f. Yellow water-lily. Rare, planted in man-made ponds, low elevations (Blount and Sevier Cos.). Not recently verified in our flora. Listed as Nelumbo in Hoffman (1964). (N. luteum ssp. macrophyllum (Small) E. O. Beal in R). Native to eastern and midwestern U.S. and Mexico. (GRSM).

Nymphaea (Gen. 2513)

**Nymphaea odorata* Ait. White water-lily. Rare, planted in a man-made pond, Sugarlands Valley (Sevier Co.). Not recently verified in our flora. Native to NE U.S. and beyond.

NYSSACEAE (Fam. 122)

Nyssa (Gen. 6151)

Nyssa sylvatica Marsh. Black gum. Common in submesic to xeric woods, low to mid-elevations. N. aquatica L. was cited in Hoffman's (1966) additions and corrections--however, the specimen is sterile and, in any case, from a cultivated tree outside the park. Hence, it is dropped from this list.

OLEACEAE (Fam. 141)

Chionanthus (Gen. 6430)

Chionanthus virginicus L. Fringe-tree. Rare, rocky streamsides, low elevations. Known only from Lower Abrams Creek (Blount Co.).

Forsythia (Gen. 6421)

**Forsythia suspensa* (Thunb.) Vah. Forsythia. Scarce, persistent after cultivation at old homesites, low elevations. Native to Asia. (Not in R).

**Forsythia viridissima* Lindl. Forsythia. Scarce, persistent at old homesites after cultivation, low elevations. One collection: Cades Cove (Blount Co.). Native to Asia. (Not in R).

Fraxinus (Gen. 6420)

Fraxinus americana L. var. *americana*. White ash. Common, rich moist woods, to ca 5,000 ft elevation, throughout.

Fraxinus americana var. *biltmoreana* (Beadle) J. Wright. Biltmore ash. Occasional, dry woods at low elevations, western GRSM. This variety has hairy twigs and leaves.

OLEACEAE (Fam. 141)

Fraxinus pennsylvanica Marsh. var. *pennsylvanica*. Green ash. Occasional, streamsides, low elevations, particularly along Abrams Creek, but to be looked for along larger streams throughout at low elevations. There is one Upland collection--Greenbrier at 3,000 ft. Twigs hairy.

Fraxinus pennsylvanica var. *subintegerrima* (Vahl) Fern. Green ash. Present with the typical variety. Twigs smooth.

Ligustrum (Gen. 6436)

**Ligustrum vulgare* L. Common privet. Frequent escape in old fields, old homesites, roadsides, thickets, low elevations. Native to Europe. (Not in R).

Syringa (Gen. 6423)

**Syringa vulgaris* L. Common lilac. Scarce introduction, persistent at old homesites. Native to Europe. (Not in R).

ONAGRACEAE (Fam. 125)

Circaea (Gen. 5828)

Circaea alpina L. Smaller enchanter's-nightshade. Frequent, moist woods, streamsides, mid- to high elevations, throughout.

Circaea lutetiana ssp. *canadensis* (L.) Asch. & Mag. Larger enchanter's-nightshade. Frequent, moist woods, trailsides, low to mid-elevations, throughout. (*C. quadrisulcata* var. *canadensis* (L.) flora of Hoffman 1964).

Epilobium (Gen. 5795)

Epilobium ciliatum Raf. Willow-herb. Infrequent, streamsides, seeps, mid-elevations, throughout. (*E. glandulosum* var. *adenocaulon* (Hausk.) Fern.). The leaves are sessile and the coma is white.

Epilobium coloratum Biehler. Willow-herb. Occasional, wet meadows, seeps, streamsides, low to mid-elevations, throughout. The leaves are petiolate and the coma is cinnamon brown.

Gaura (Gen. 5819)

Gaura biennis L. Biennial gaura. Infrequent, fields, roadsides, low elevations, throughout.

Ludwigia (Gen. 5793)

Ludwigia alternifolia L. Alternate-leaved seedbox. Occasional, disturbed sites, low elevations, throughout.

Ludwigia decurrens Walter. Decurrent seedbox. Rare, wet ground, streamsides, shores. Only two sites currently known: Cades Cove (Blount Co.) and shore of Fontana Lake (Swain Co.) (PSW).

Ludwigia palustris var. *americana* (DC.) Fern. & Grisc. Water-purslane. Scarce, marshy ground, sinkhole ponds, shores. Known at present only from western GRSM (Blount Co.). (Included in *L. palustris* (L.) Ell. in R).

ONAGRACEAE (Cont.)

Oenothera (Gen. 5804)

- Oenothera biennis L. Evening primrose. Frequent, moist to dry thickets, roadsides, fields, low to mid-elevations, throughout.
- Oenothera fruticosa L. Sundrops. Occasional, roadsides, trailsides, open woods, low to mid-elevations, throughout. Variable (including O. fruticosa var. linearis (Michx.) S. Wats of Hoffman's list). The capsule is clavate, pubescent with nonglandular hairs. Further work, however, may reveal that only one taxon occurs in GRSM (see O. tetragona Roth, below).
- Oenothera laciniata Hill. Cut-leaved evening primrose. Occasional, fields, roadsides, low elevations, throughout.
- *Oenothera speciosa Nutt. Showy evening-primrose. Occasional, fields, roadsides, low to mid-elevations, throughout. Native to midwestern U.S.
- Oenothera tetragona Roth. Sundrops. Occasional, open woods, roadsides, trailsides, low to mid-elevations, throughout. Very variable (including here Oenothera tetragona var. fraseri (Pursh) Munz, O. tetragona var. latifolia (Rydb.) Fern., and O. tetragona var. longistipata (Pennell) Munz). The capsule is ellipsoid and either glabrous or with gland-tipped or blunt hairs (see O. fruticosa L.). Most of the material I have seen fits this taxon; a recent monograph, however, placed all our specimens in O. fruticosa ssp. glauca (Michx.) Stroky.

ORONBANCHACEAE (Fam. 156)

Conopholis (Gen. 7790)

- Conopholis americana (L.) Wallr. Frequent, submesic to xeric woods, low to mid-elevations, throughout. Parasitic.

Epifagus (Gen. 7792)

- Epifagus virginiana (L.) Bart. Beechdrops. Frequent, mesic woods, throughout. Parasitic on beech.

Orobanche (Gen. 7791)

- Orobanche uniflora L. One-flowered cancer-root. Occasional, mesic woods, low to mid-elevations, throughout. Parasitic. Inconspicuous and perhaps overlooked.

OXALICACEAE (Fam. 85)

Oxalis (Gen. 3936)

- Oxalis dillenii Jacquin. Yellow sorrell. Frequent, thickets, paths, fields, roadsides, low to high elevations, throughout. The inflorescence is umbellate. (O. stricta L. of Hoffman's list).
- Oxalis grandis Small. Large wood-sorrell. Occasional, submesic woods, trailsides, low to mid-elevations, throughout.

OXALIDACEAE (Cont.)

Oxalis montana Raf. Wood-sorrell. Common, high elevation woods, throughout.
(*O. acetosella* L. in R).

Oxalis stricta L. Yellow wood-sorrell. Frequent, woods, thickets, roadsides,
low to high elevations, throughout. The inflorescence is cymose.
(*O. europaea* Jordan of Hoffman's list).

Oxalis violacea L. Violet wood-sorrell. Occasional, dry woods, rock slopes,
trailsides, low to mid-elevations, throughout.

PAPAVERACEAE (Fam. 71B)

Sanguinaria (Gen. 2841)

Sanguinaria canadensis L. Bloodroot. Mesic woods, floodplains, lower
elevations. Plants with leaf margins dentate, barely undulate, or
entire have been segregated as *Sanguinaria canadensis* var. *rotundifolia*
(Greene) Fedde (reported first in Hoffman (1966b)) versus, in the typical
variety, leaf margins coarsely dentate or ocnate. Leaves matching both
the typical and round-leaf variety can be seen in the area; they are
doubtfully maintainable as subspecific taxa.

PASSIFLORACEAE (Fam. 116)

Passiflora (Gen. 5372)

Passiflora incarnata L. Passion-flower, May-pop. Occasional, old fields,
roadsides, thickets, low elevations, probably throughout but most
conspicuous in western GRSM.

Passiflora lutea L. Yellow passion-flower. Occasional, thickets, young woods,
submesic woods, low to mid-elevations, throughout.

PHRYMACEAE (Fam. 159)

Phryma (Gen. 8115)

Phryma leptostachya L. Lopseed. Frequent in rich moist woods and at old
homesites, low to mid-elevations, throughout.

PHYTOLACCACEAE (Fam. 58)

Phytolacca (Gen. 2380)

Phytolacca americana L. Pokeweed. Frequent in disturbed areas, old fields,
roadsides, and forest gaps, low to mid-elevations, throughout.

PLANTAGINACEAE (Fam. 160)

Plantago (Gen. 8116)

Plantago aristata Michx. Bracted plantain. Occasional, dry roadsides,
fields, low elevations (Blount, Sevier, Swain Cos.).

PLANTAGINACEAE (Cont.)

- **Plantago lanceolata* L. Ribgrass. Common, roadsides and fields, low to mid-elevations, throughout. Native to Europe.
- Plantago pusilla* Nutt. Small plantain. Rare, roadside, mid-elevation. Known only from Cataloochee area (Haywood Co.) (PSW). (Not in R; keys to *P. heterophylla* Nutt. in R).
- Plantago rugelii* Dcne. Broad-leaved plantain, White man's footprint. Common, roadsides, fields, lawns, paths, disturbed soil, low to high elevations, throughout.
- Plantago virginica* L. Virginia plantain. Occasional, dry to moist soil, in openings, roadsides, low to mid-elevations, probably throughout but little collected.

PLATANACEAE (Fam. 81)

Platanus (Gen. 3314)

- Platanus occidentalis* L. Sycamore. Common, along larger streams, low to mid-elevations, throughout.

PODOSTEMACEAE (Fam. 77)

Podostemum (Gen. 3156)

- Podostemum ceratophyllum* Michx. Riverweed. Occasional, rocks submerged in streams, low to mid-elevations, throughout. Easily overlooked or mistaken for a lower plant; one of the few aquatic vascular plants in GRSM.

POLEMONIACEAE (Fam. 147)

Phlox (Gen. 7014)

- Phlox amoena* Sims. Narrow-leaved phlox. Scarce, dry woods, low elevations, western GRSM (Blount Co.).
- Phlox amplifolia* Britt. Broad-leaved phlox. Occasional, submesic to mesic woods, thickets, low to mid-elevations, throughout.
- Phlox carolina* L. Carolina phlox. Occasional, woods and thickets, low to mid-elevations, throughout. Difficult to separate from *P. glaberrima* L. Using the key in R, most of our collections are *P. carolina* L. (calyx membranes weak; firm in *P. glaberrima* L.). However, the calyx in all but a few of our collections is 5-8 mm long (including lobes)--in Fernald (1950) this places most of our collections in *P. glaberrima* L. (Including *P. carolina* var. *triflora* (Michx.) Wherry of Hoffman's list). *Phlox carolina*, *P. glaberrima*, and *P. maculata* form an intergrading complex in need of further work.
- Phlox divaricata* L. Blue phlox. Occasional, mesic woods, low to mid-elevations. Collected from Blount and Sevier Counties.
- **Phlox drummondii* Hooker. Drummond phlox. Rare escape from cultivation. A single collection from a Sevier County old homesite. Native to E. Texas.

POLEMONIACEAE (Cont.)

- Phlox glaberrima L. Smooth phlox. Occasional, streamsides, thickets, low to mid-elevations, throughout. See P. carolina L. above. (Including P. glaberrima var. interior Wherry of Hoffman's list; P. carolina var. triflora (Michx.) Wherry is placed in P. glaberrima by R).
- Phlox maculata L. Meadow phlox. Frequent, streamsides, low to mid-elevations, throughout. (Including P. maculata var. purpurea Michx. of Hoffman's list). The inflorescence is cylindric (corymbose in the related P. carolina L. and P. glaberrima L.).
- Phlox ovata L. Mountain phlox. Rare, limestone woods, low elevations. White Oak Sink (Blount Co.) (PSW).
- Phlox paniculata L. Summer phlox. Occasional, mesic woods, roadsides, thickets, low to high elevations, throughout. Some populations may be escapes from garden plants.
- Phlox stolonifera Sims. Creeping phlox. Occasional, moist woods, streamsides, low to mid-elevations, throughout.
- *Phlox subulata L. Moss-phlox. Rare, persistent after cultivation, low elevations. Sevier and Swain Counties. Native to eastern U.S., but no native populations are known to be present in GRSM.

Polemonium (Gen. 7017)

- *Polemonium reptans L. Greek valerian, Jacob's ladder. Rare, the only GRSM station, at Elkmont, is probably an introduction (Sevier Co.). Native to eastern and midwestern U.S.

POLYGALACEAE (Fam. 91)

Polygala (Gen. 4273)

- Polygala cruciata L. Cross-leaved milkwort. Rare, wet meadows, low elevations. The collections are from Cades Cove, Blount County (Sharp et al. 11790 at GRSM, and Iltis 2486 at TENN).
- Polygala curtissii Gray. Curtiss' milkwort. Frequent, dry woods, low to mid-elevations, throughout.
- Polygala paucifolia Willd. Fringed polygala. Infrequent, dry woods, low elevations, western GRSM (Blount and Sevier Cos.).
- Polygala polygama Walt. Racemed milkwort. Infrequent, dry woods, low elevations, western GRSM (Blount and Swain Cos.).
- Polygala sanguinea L. Field milkwort. Frequent, dry woods, thickets, fields, low elevations, throughout. (Including P. sanguinea f. viridescens (L.) Farw., a form with greenish flowers).
- Polygala senega var. latifolia T. & G. Seneca snakeroot. Scarce, dry limestone woods, low elevations. Rich Mountain Gap (Blount Co.) (Included in P. senega L. in R).
- Polygala verticillata L. Whorled milkwort. Scarce, dry woods, low elevations, western GRSM (Blount Co.). (Including P. verticillata var. ambigua (Nutt.) of Hoffman's list).

POLYGONACEAE (Fam. 54)

Fagopyrum (Gen. 2202)

- *Fagopyrum esculentum. Moench. Rare, persistent after cultivation, low elevations. Cades Cove (Blount Co.).

Polygonum (Gen. 2201)

- Polygonum aviculare L. Bird knotweed. Occasional in disturbed areas, roadsides, lawns, sidewalks. (Including Polygonum aviculare var. littorale (Link) W. D. J. Koch--Horton 1972).
- Polygonum caespitosum var. longisetum (De Bruyn) Steward. Smartweed. Thickets, low elevations, based on a single collection by Dan Pittillo (WCU).
- Polygonum cilinode Michx. Climbing buckwheat. Scarce, thickets, forest edges, open habitats, trailsides, high elevations. Scattered along the AT from near Silers Bald to Spence Field, also trail to Andrews Bald and near Mt. Sterling. Listed as "possibly extirpated" by Committee for Tennessee Rare Plants (1978) but recently rediscovered (Blount, Swain, Haywood Cos.).
- *Polygonum convolvulus L. Black bindweed. Moist thickets, mid-elevation. One collection (Swain Co.). Native to Europe. The achenes are rough-surfaced and dull (smooth and shiny in the similar P. scandens L.--Horton 1972).
- *Polygonum cuspidatum Siebold & Zucc. Japanese knotweed. Rare introduction, roadsides, low elevations. One collection (Sevier Co., near Cherokee Orchard) (PSW). Native to E. Asia.
- Polygonum erectum L. Knotweed. Infrequent, disturbed areas, roadsides, lawns, sidewalks. Blount and Sevier Counties.
- Polygonum hydropiperoides Michx. Water smartweed. Infrequent, marshes, low elevations. All the collections from Cades Cove (Blount Co.).
- Polygonum lapathifolium L. Smartweed. Two collections (GRSM) appear to be this species: wet thickets, Elkmont (Sevier Co.) and Cades Cove (Blount Co.). Further collection is needed.
- *Polygonum orientale L. Prince's feather. Infrequent, old homesites, old fields, streamsides, low elevations. Native to Eurasia.
- Polygonum pensylvanicum L. Pennsylvania smartweed. Occasional in disturbed areas, throughout. (Including P. pensylvanicum var. laevigatum Fern.).
- *Polygonum persicaria L. Lady's thumb. Occasional, disturbed areas, open habitats, throughout. Native to Europe.
- Polygonum punctatum Ell. Punctate smartweed. Frequent in open to partly shaded marshes, low elevations. (Including Polygonum punctatum var. leptostachyum (Metsn.) Small--Horton (1972)).
- Polygonum sagittatum L. Tearthumb. Frequent, open marshes, wet thickets, streamsides, low elevation, throughout.
- Polygonum scandens L. Climbing buckwheat. Frequent, disturbed patches in woods, thickets, low to mid-elevations, throughout. In this species the achenes are smooth and shiny (rough and dull in the similar P. convolvulus Michx. in Horton 1972). (Includes P. cristatum Engelm. & Gray--Horton 1972; includes P. scandens var. cristatum (Engelm. & Gray) Gleason of R).

POLYGONACEAE (Cont.)

Polygonum setaceum Baldw. ex Ell. Rare, roadside, mid-elevations, based on a single collection at GRSM (Jennison 423--Swain Co.).

Rumex (Gen. 2195)

**Rumex acetosella* L. Sheep sorrell. Frequent, fields, grassy balds, disturbed ground, roadsides, low to high elevations, throughout. Native to Europe.

**Rumex crispus* L. Curled dock. Frequent, fields, roadsides, low to mid-elevations, throughout. Native to Europe. According to Horton (1972), *R. patientia* is similar, but has fruits 0-1 on each mature calyx; it is within our area; some specimens bear immature fruits and could not be determined with Horton's keys.

**Rumex obtusifolius* L. Bitter dock. Frequent, fields, thickets, streamsides, low to mid-elevations, throughout. Native to Europe. According to Horton (1972), *R. pulcher* is similar, but the achenes are lustrous; it is to be looked for in our area.

Tovara (Gen. 2201B)

Tovara virginiana (L.) Raf. Virginia knotweed. Common, mesic woods, low to mid-elevations, throughout. (*Antenoron virginianum* (L.) Roberty & Vautier of Horton (1972); *Polygonum virginianum* L. of some authors).

PORTULACACEAE (Fam. 60)

Claytonia (Gen. 2414)

Claytonia caroliniana Michx. Spring-beauty. Common, mesic woods, low to high elevations, throughout.

Claytonia virginica L. Narrow-leaved spring-beauty. Occasional, mesic woods, conspicuous at low elevations, but probably throughout.

Portulaca (Gen. 2421)

**Portulaca oleracea* L. Common purslane. Scarce, roadsides, disturbed soil, low elevations. Native to Europe.

PRIMULACEAE (Fam. 135)

Dodacatheon (Gen. 6341)

Dodacatheon maedia L. Blazing star. Rare, wooded limestone slopes, low elevations. White Oak Sink only (Blount Co.) (PSW).

Lysimachia (Gen. 6330)

Lysimachia ciliata L. Ciliate loosestrife. Scarce, wet meadows, streamsides, low elevations. Collected from Cades Cove (Blount Co.).

Lysimachia fraseri. Duby. Fraser's loosestrife. Rare, known from a single collection: "near Gatlinburg" (Sevier Co., Freeman 1 at DUKE, 7/8/35).

Lysimachia hybrida Michx. Intermediate loosestrife. Scarce, wet meadows, low elevations. Collected from Cades Cove (Blount Co.). (*L. lanceolata* var. *hybrida* (Michx.) Gray in R.).

PRIMULACEAE (Cont.)

Lysimachia lanceolata Walt. Narrow-leaved loosestrife. Infrequent, wet meadows, streamsides, low elevations. Collected from Blount and Swain Counties.

**Lysimachia nummularia* L. Moneywort. Infrequent, marshes, moist thickets, low elevations. The collections are from Cades Cove (Blount Co.) (Hoffman 1966b). Native to Europe.

Lysimachia quadrifolia L. Whorled loosestrife. Frequent, subxeric to xeric woods, roadbanks, trailsides, thickets, low to mid-elevations, throughout.

Lysimachia tonsa (Wood) Kunth. Smooth loosestrife. Scarce, moist woods, streamsides, low elevations. Collected from Blount and Sevier Counties.

Samolus (Gen. 6328)

Samolus parviflorus Raf. Samolus. Occasional, seeps, streamsides, low to mid-elevations, probably throughout, but the collections are from Blount County.

PYROLACEAE (Fam. 132)

Chimaphila (Gen. 6166)

Chimaphila maculata (L.) Pursh. Striped pipsissewa. Submesic to xeric woods, low to mid-elevations, throughout.

Monotropa (Gen. 6169)

Monotropa hypopithys L. Pine-sap. Frequent, mesic to subxeric woods, low to mid-elevations, throughout.

Monotropa uniflora L. Indian pipe. Common, mesic to subxeric woods, low to high elevations, throughout.

Monotropsis (Gen. 6172)

Monotropsis lehmaniae Burm. f. Lehman's sweet pine-sap. Rare, known from a single collection: Rabbit Creek Valley, 1,800 ft, Blount County (Jennison 928 at GRSM). (*M. odorata* var. *lehmaniae* (Burm. f.) Ahles in R). The leaves are fleshy in *M. lehmaniae* (chaffy in *M. odorata*).

Monotropsis odorata Schweinitz in Ell. Sweet pine-sap. Infrequent, dry woods, low to mid-elevations, throughout.

RANUNCULACEAE (Fam. 64)

Aconitum (Gen. 2540)

Aconitum uncinatum L. Monk's hood. Occasional, seeps, streamsides, wet rocks, low to high elevations, throughout. (Including *A. uncinatum* var. *acutidens* Fern. and *A. uncinatum* ssp. *muticum* DC. of Hoffman 1966b).

Actaea (Gen. 2537)

Actaea pachypoda Ell. White baneberry. Frequent, mesic to submesic woods, low to high elevations, throughout.

RANUNCULACEAE (Cont.)

Anemone (Gen. 2541)

- Anemone lancifolia* Pursh. Lance-leaved wood anemone. Occasional, rich woods, low to mid-elevations, throughout. Perhaps just a low elevation race of *A. quinquefolia* L. In *A. lancifolia* Pursh the terminal leaflet is toothed, not incised, and the sepal veins anastomose below their tips (terminal leaflets divided, sepal veins forked only towards the tips and at most with only a few junctions between veins in *A. quinquefolia*).
- Anemone quinquefolia* L. Wood anemone. Frequent, mesic woods, low to high elevations, throughout. (See *A. lancifolia* Pursh, above).
- Anemone virginiana* L. Thimbleweed. Frequent, dry woods, thickets, fields, low to mid-elevations, throughout.

Anemonella (Gen. 2548)

- Anemonella thalictroides* (L.) Spach. Rue-anemone. Frequent, mesic to submesic woods, low to mid-elevations, throughout. (*Thalictrum thalictroides* (L.) Boivin in R).

Aquilegia (Gen. 2538)

- Aquilegia canadensis* L. Columbine. Frequent, rocky woods, except at the high elevations, throughout.
- **Aquilegia vulgaris* L. European columbine. Rare escape, roadside near Elkmont, low elevation (Sevier Co.) (PSW). Native to Europe.

Cimicifuga (Gen. 2537A)

- Cimicifuga americana* Michx. Mountain bugbane. Common, mesic woods, mid-elevations, throughout.
- Cimicifuga racemosa* (L.) Nutt. Black cohosh. Common, mesic woods, low to mid-elevations, throughout.

Clematis (Gen. 2542)

- **Clematis dioscoreifolia* var. *robusta* (Corr.) Rehd. Clematis. Occasional, fields, thickets, roadsides, low elevations. Other *Clematis* species are cultivated in the vicinity of GRSM and may eventually prove to be part of our flora. Native to E. Asia. (Included in *C. dioscoreifolia* Levl. & Vanioi in R).
- Clematis viorna* L. Leatherflower. Occasional, submesic to subxeric woods and thickets, throughout.
- Clematis virginiana* L. Virgin's bower. Frequent, roadsides, thickets, mostly at low elevations, throughout.

Delphinium (Gen. 2539)

- **Delphinium ambiguum* L. Garden larkspur. A rare escape, disturbed areas near old homesites, low elevations. Known from one collection made at a homesite in Cades Cove (Blount Co.). (*D. ajacis* L., see Kral 1976). Native to Europe.

RANUNCULACEAE (Cont.)

Delphinium tricornе Michx. Dwarf larkspur. Rare, wooded limestone slopes, low elevations. Known only from White Oak Sink and Rich Mountain Gap (Blount Co.).

Hepatica (Gen. 2541A)

Hepatica acutiloba DC. Sharp-lobed hepatica. Frequent, moist rocky woods, low to mid-elevations.

Hepatica americana (DC) Ker. Round-lobed hepatica. Scarce, rocky woods, low elevations--in my records, this taxon is conspicuous only in White Oak Sink.

Ranunculus (Gen. 2546)

Ranunculus abortivus L. Small-flowered buttercup. Common, mesic fields, paths, woods, thickets, low to mid-elevations, throughout.

**Ranunculus acris* L. Tall buttercup. Occasional, fields, roadsides, mostly at high elevations. Native to Europe.

Ranunculus allegheniensis Britt. Allegheny early buttercup. Occasional, mesic trailsides, thickets, woods, mid-elevations. Cataloochee and Mt. Sterling area (Haywood Co.).

**Ranunculus bulbosus* L. Bulbous buttercup. Scarce, wet thickets, roadsides, lawns, low elevations. Currently known from Blount and Sevier Counties. Native to Europe.

Ranunculus carolinianus DC. Carolina buttercup. Occasional, dry woods, low to mid-elevations. The separation of this taxon from the very variable *R. hispidus* Michx. is problematic in GRSM.

Ranunculus fascicularis Muhl. Early buttercup. Rare, dry woods, low elevations. Lower Abrams Creek (Blount Co.). (PSW). (Included in *R. hispidus* Michx. in R).

Ranunculus hispidus Michx. Hairy buttercup. Common, woods, roadbanks, low to high elevations, throughout. A very variable taxon. Including *Ranunculus hispidus* var. *greenmanii* Benson of the Hoffman list, and perhaps also *R. carolinianus* DC, *R. fascicularis* Muhl., and *R. septentrionalis* Poir.

Ranunculus laxicaulis (T. & G.) Darby. Weak-stemmed buttercup. Rare, wet ditches, ponds, shaded and open, low elevations. Cades Cove (Blount Co.) (TENN). An unlikely species for the mountains (only three South Carolina counties listed in Radford et al. 1968), yet the material clearly keys here.

**Ranunculus parviflorus* L. Small-flowered buttercup. Infrequent, roadsides, old fields, low elevations, probably throughout. Native to Europe.

Ranunculus pusillus Poir. Aquatic buttercup. Rare, wet ditches, ponds, low elevations. Cades Cove (Blount Co.). Material in the herbaria is adequate and keys here; similar to and with *R. laxicaulis* (T. & G.) Darby (see above).

Ranunculus recurvatus Poir. Hooked buttercup. Common, mesic woods and thickets, low to high elevations, throughout.

**Ranunculus repens* L. Creeping buttercup. Rare, wet thickets near old homesites, low elevation. Cataloochee (Haywood Co.) (PSW). Native to Europe. (Rogers and Bowers 1971).

RANUNCULACEAE (Cont.)

Ranunculus septentrionalis Poir. Swamp buttercup. Occasional, thickets, low to high elevations. Smooth *R. hispidus* Michx. would key here and suggests that the verification of this taxon in GRSM needs further work. (Included in *R. hispidus* Michx. in R).

Thalictrum (Gen. 2548)

Thalictrum clavatum DC. Brook meadowrue. Frequent, rocky streamsides, low to high elevations, throughout.

Thalictrum coriaceum (Britt.) Small. Stalked-fruited meadowrue. Occasional, mesic to submesic woods, low to mid-elevations, throughout. The fruits are born on a stipe.

Thalictrum dioicum L. Early meadowrue. Frequent, rich moist woods, low to mid-elevations, throughout.

Thalictrum polygamum Muhl. Tall meadowrue. Frequent, moist woods, balds, thickets, mid- to high elevations, throughout. (*T. pubescens* Pursh of some authors).

Thalictrum revolutum DC. Waxy meadowrue. Occasional, mesic woods, thickets, low to mid-elevations, throughout. The fruits and leaflets (beneath) are described as bearing stipitate glands. I have seen young achenes with dense stipitate glands, but older specimens seem to have only occasional glands. The undersides of leaflets in the specimens I have seen are minutely papillose rather than distinctly stipitate glandular. (*T. polygamum* Muhl. has nonglandular achenes and leaves).

Trautvetteria (Gen. 2545)

Trautvetteria caroliniensis (Walt.) Vail. False bugbane. Frequent, mesic woods, thickets, streamsides, low to high elevations, throughout. More abundant at high elevations.

Xanthorhiza (Gen. 2535)

Xanthorhiza simplicissima Marsh. Shrub yellowroot. Frequent, rocky streamsides, low to mid-elevations, throughout.

RHAMNACEAE (Fam. 106)

Ceanothus (Gen. 4877)

Ceanothus americanus L. New Jersey tea. Frequent, dry woods, thickets, low elevations.

Rhamnus (Gen. 4875)

Rhamnus caroliniana Walt. Carolina buckthorn. Infrequent woods and thickets, low elevations. Most prominent in Cades Cove and the Lower Abrams Creek area, western GRSM.

ROSACEAE (Fam. 82)

Agrimonia (Gen. 3376)

- Agrimonia gryposepala* Wallr. Large-fruited agrimony. Occasional, submesic woods, low to mid-elevations. Collected from Haywood and Swain Counties.
- Agrimonia parviflora* Ait. Small-flowered agrimony. Frequent, old homesites, moist thickets, low to mid-elevations, throughout.
- Agrimonia pubescens* Wallr. Hairy agrimony. Occasional, submesic to subxeric woods, low elevations. The collections are from western GRSM (Blount Co.).
- Agrimonia rostellata* Wallr. Beaked agrimony. Occasional, submesic woods, low elevations. The collections are from western GRSM (Blount Co.).

Alchemilla (Gen. 3375)

- **Alchemilla microcarpa* Boiss. & Reut. *Alchemilla*. Rare introduction, roadsides, low elevations. Near Sugarlands Headquarters Building (Sevier Co.). Native to Europe.

Amelanchier (Gen. 3343)

- Amelanchier arborea* (Michx. f.) Fern. Hairy-leaved shadbush. Occasional, submesic to dry, open, woods, low to mid-elevations, throughout. When in bloom the leaves are folded and covered with a white felt below, but the leaves are soon glabrous (leaves purplish, only slightly hairy when young in *A. laevis*). The species are difficult to separate except when in bloom.
- Amelanchier laevis* Wieg. Smooth shadbush, Juneberry. Common, mesic to submesic woods, low to high elevations, throughout. (*A. arborea* var. *laevis* (Wieg.) Ahles in R).
- Amelanchier sanguinea* (Pursh) DC. Round-leaved shadbush. Rare, dry woods, low elevations. Known in the park only from slopes in the Lower Abrams Creek area (Blount Co.) (PSW). Hoffman's record was based on a specimen collected outside our boundaries (Sevier Co.).

Aronia (Gen. 3338)

- Aronia arbutifolia* (L.) Ell. Hairy chokeberry. Scarce, moist to dry thickets. Collected from Cades Cove (Blount Co.) and the Brushy Mountain area (Sevier Co.). (*Pyrus arbutifolia* (L.) L. f.; *Sorbus arbutifolia* (L.) Heynh. var. *arbutifolia* in R).
- Aronia atropurpurea* Britt. Purple chokeberry. Rare, wet meadows, low elevations. Cades Cove (Blount Co.; Sharp 22218 at TENN). (*Pyrus floribunda* Lindl.; *Sorbus arbutifolia* var. *atropurpurea* (Britt.) Schneid. in R).
- Aronia melanocarpa* (Michx.) Ell. Black chokeberry. Frequent, dry woods, heath balds, low to high elevations, throughout. (*Pyrus melanocarpa* (Michx.) Willd.; *Sorbus melanocarpa* (Michx.) Schneid. in R).

Aruncus (Gen. 3322)

- Aruncus dioicus* (Walt.) Fern. Goat's beard. Frequent, mesic to subxeric woods, thickets, low to mid-elevations, throughout.

ROSACEAE (Cont.)

Chaenomeles (Gen. 3336A)

- **Chaenomeles lagenaria* (Loisel.) Koidz. Flowering quince. Rare, persisting at old homesites, low elevations. (Not in R). Native to E. Asia.

Crataegus (Gen. 3345)

- Crataegus biltmoreana* Beadle. Biltmore's hawthorn. Infrequent, dry woods, low elevations. Collected from White Oak Sink and Lower Abrams Creek area (Blount Co.). The leaves are ovate, widely cuneate at the base, doubly toothed, and hairy beneath (similar, but glabrous beneath in *C. boyntonii* Beadle). (Included in *C. flabellata* (Bosc.) K. Koch in R).
- Crataegus boyntonii* Beadle. Boynton's hawthorn. Scarce, dry woods, low elevations. Collected from the Lower Abrams Creek area (Blount Co.). (See *C. biltmoreana* above). (Included in *C. flabellata* (Bosc.) K. Koch in R).
- Crataegus calpodendron* (Ehrh.) Medic. Limestone hawthorn. Scarce, limestone slopes, low elevations. Western GRSM (Blount Co.). (Including *C. calpodendron* var. *microcarpa* (Chapm.) Palmer). The leaves are obovate, cuneate based and attenuate (the petiole almost winged), more or less veiny and doubly toothed.
- Crataegus collina* Chapm. Round-leaved hawthorn. Rare, limestone slopes, low elevations. Collected near Rich Mountain Gap (Blount Co.). The leaves are obovate to nearly round, and single-toothed. (Not in R).
- Crataegus crus-galli* L. Cock-spur thorn. Infrequent, streambanks, fields, rocky woods, low to mid-elevations. Western GRSM (Blount Co.). Includes a range in leaf sizes here, but the leaves are basically narrowly obovate, thick, acute, or obtuse at the apex, and single-toothed. One collection is from near Gregory Balds (ca 4,800 ft) and was originally determined as *C. regalis* Beadle (Harbison H-39 at TENN and GRSM); other collections are from low elevations.
- Crataegus deltoides* Ashe. Triangle-leaved hawthorn. Rare, limestone thickets, woods, low elevations. Collected from Cades Cove and Rich Mountain Gap (Blount Co.). (*C. cibaria* Beadle of Hoffman's list). Leaves are widely deltoid with a straight, cordate, or slightly cuneate base and are doubly toothed. A distinctive leaf form, but the taxonomy uncertain. (Not in R).
- Crataegus gattingeri* Ashe. Gattinger's hawthorn. Rare, grassy balds, mid-elevations. Known from a single collection: Gregory Bald (Blount Co.; Cain, unnumbered, 8/4/29, at TENN). Basally lobed; otherwise similar to *C. macrosperma*. (Not in R).
- Crataegus macrosperma* Ashe. Scarlet hawthorn. Frequent, streamsides, dry woods, fields, balds, low to mid-elevations, throughout. A variable species with ovate, doubly toothed leaves and a rounded base. (Including *C. macrosperma* var. *roanensis* (Ashe) Palmer; *C. flabellata* (Bosc.) K. Koch in R).
- Crataegus palmeri* Sarg. Palmer's hawthorn. Rare, streamsides, low elevations. A single collection: Oconaluftee, Swain County (White 2583 at GRSM). (PSW). Leaves are elliptic, slightly double toothed, acute at the tip and cuneate at the base. Resembling *C. calpodendron* and *C. punctata* Jacq. in overall leaf shape but not as veiny. Leaves more acute, thinner, wider, and more toothed toward the base than *C. crus-galli*. A difficult specimen to place.

ROSACEAE (Cont.)

Crataegus pinetorum Beadle. Hawthorn. Scarce, rocky woods, low elevations. Collected from White Oak Sinks, Lower Abrams Creek, and Rich Mountain Gap (Blount Co.). (PSW). The leaves are ovate, broadly cuneate at the base, and doubly serrate. (Not in R). Listed by Hoffman based on a specimen outside GRSM.

Duchesnea (Gen. 3355)

**Duchesnea indica* (Andr.) Focke. Barren strawberry. Frequent, roadsides, fields, lawns, low elevations, throughout. Native to India.

Fragaria (Gen. 3354)

Fragaria virginiana Duchesne. Wild strawberry. Frequent, fields, roadsides, low to high elevations, throughout. (Including *F. virginiana* var. *illinoensis* (Prince) Gray).

Geum (Gen. 3365)

Geum canadense Jacq. White avens. Frequent, mesic to submesic thickets, old fields, young woods, low to mid-elevations, throughout.

Geum radiatum Gray. Mountain avens. Very rare, cliffs, high elevations. Known from a single station, Mt. LeConte (Sevier Co.). A record from Gregory Bald (Blount Co.) has not been recently verified.

Geum vernum (Raf.) T. & G. Early avens. Occasional, moist thickets, trailsides, low to mid-elevations. Collections are from Sevier, Haywood, and Swain Counties.

Geum virginianum L. Small-flowered avens. Scarce or overlooked, woods and thickets, low to mid-elevations, throughout.

Gillenia (Gen. 3325)

Gillenia stipulata (Muhl.) Baill. Indian physic. Scarce, dry woods, low to mid-elevations. Lower Abrams Creek (Blount Co.).

Gillenia trifoliata (L.) Moench. Bowman's root. Frequent, dry woods, low to mid-elevations, throughout.

Kerria (Gen. 3351)

**Kerria japonica* (L.) DC. *Kerria*. Rare, persistent and vegetatively spreading at old homesites, low elevations. Native to E. Asia. (Not in R).

Malus (Gen. 3338)

Malus angustifolia (Ait.) Michx. Wild crabapple. Occasional, mesic to submesic woods, thickets, old fields, low elevations, throughout. (*Pyrus angustifolia* Ait.).

**Malus pumila* Mill. Apple. Frequent, old homesites, roadsides, low to mid-elevations, throughout. Native to Eurasia. (*Pyrus malus* L. in Gray's Manual (Fernald 1950)).

ROSACEAE (Cont.)

Physocarpus (Gen. 3316)

Physocarpus opulifolius (L.) Maxim. Ninebark. Rare, rocky woods, cliffs, low elevations. White Oak Sink and Rt. 129 (Lower Abrams Creek area) (Blount Co.).

Potentilla (Gen. 3356)

**Potentilla anserina* L. Silverweed. Growing in a disturbed area and probably adventive (from the northwestern U.S.). Native to northern N. America. (The first record of this species in Tennessee is the GRSM locale-- Rogers and Bowers 1969; TENN). (Not in R).

Potentilla canadensis L. Dwarf cinquefoil. Frequent, roadsides, fields, balds, low to high elevations, throughout. (Including *P. canadensis* f. *ochroleuca* (Weath.) Fern. and *P. canadensis* var. *villosissima* Fern. of Hoffman's list).

Potentilla norvegica L. Rough cinquefoil. Frequent, roadsides, thickets, balds, low to high elevation, throughout. More abundant at higher elevations.

**Potentilla recta* L. Rough-fruited cinquefoil. Frequent, fields, roadsides, low to mid-elevations, throughout. Native to Europe.

Potentilla simplex Michx. Common cinquefoil. Common, dry woods, thickets, low to mid-elevations, throughout.

Prunus (Gen. 3396)

Prunus americana Marsh. Wild plum. Occasional, old fields, homesites, roadsides, low elevations, throughout.

Prunus angustifolia Marsh. Chickasaw plum. Occasional, old fields, homesites, low elevations, throughout.

**Prunus avium* L. Sweet cherry. Rare, persistent after cultivation, old homesites, low elevations. The collections are from Sevier County. Native to Eurasia.

**Prunus cerasus* L. Sour cherry. Rare, persistent after cultivation, old homesites, low elevations (see Stupka 1964). Native to Asia.

Prunus hortulana Bailey. Hortulan plum. Occasional, fields, old homesites, thickets, low elevations. Collected from Blount, Sevier, and Swain Counties. Perhaps originally cultivated (Not in R). Plum trees with glandular leaf teeth and gland-edged calyx lobes are here placed in *P. hortulana* and *P. munsoniana*. They are not always easily separated; typically, *P. hortulana* has flat, ovate leaves, conspicuously veiny beneath, and the leaf teeth are spreading with glands pointing outward (*P. munsoniana* has leaves which are often folded, obovate or oblong, not veiny beneath, and the leaf teeth are rounded with the gland on the inner side, facing or adjacent to the sinus). *P. hortulana* has flowers born along slender branches as the leaves emerge (*P. munsoniana* has flowers born on short lateral spurs before the leaves emerge).

**Prunus munsoniana* Wight & Hedrick. Munson plum. Occasional, fields, old homesites, low elevations. Collected from Blount and Sevier Counties. See *P. hortulana* above.

ROSACEAE (Cont.)

Prunus pensylvanica L. f. Pin cherry. Common, on disturbed sites, mid- to high elevations, throughout.

**Prunus persica* (L.) Batsch. Peach. Scarce, introduction, persisting at old homesites, low to mid-elevations. Native to Asia.

Prunus serotina Ehrh. Black cherry. Common, mesic to subxeric woods, low to high elevations, throughout.

Prunus virginiana L. Chokeberry. Very rare, rocky woods, mid-elevation. Known from a single site off Rt. 441 at 3,400 ft (Sevier Co.).

Pyrus (Gen. 3338)

**Pyrus communis* L. Pear. Scarce introduction, old homesites, low elevations. Collected near Elkmont (Sevier Co.). Native to Eurasia.

Rosa (Gen. 3389)

Rosa arkansana Porter. Arkansas rose. Rare, known from a single collection: "Open island, 3,500 ft, Big Creek", Haywood County (Jennison and Bain 1177 at GRSM and TENN). Although the specimen is distinctive, the identification remains problematic (see Stupka 1964). (*R. arkansana* is out of range here).

**Rosa canina* L. Dog rose. Rare; persistent after cultivation, Cades Cove (Blount Co.) (PSW).

Rosa carolina L. Carolina rose. Infrequent, dry woods, thickets. Cades Cove, White Oak Sinks, and Rich Mountain Gap (all Blount Co.).

**Rosa centifolia* L. Cabbage rose. Rare; persistent after cultivation, park boundary near Greenbrier (Sevier Co.) (PSW). Native to Asia.

**Rosa eglanteria* L. Sweetbriar. Scarce, roadsides, old homesites, low elevations. Collected from Haywood County. Native to Europe.

**Rosa multiflora* Thunberg. Multiflora rose. Occasional, roadsides, old homesites, low elevations (Sevier, Blount, and Haywood Cos.). (PSW). Native to E. Asia.

Rosa palustris Marsh. Swamp rose. Occasional, streamsides, marshes, low to mid-elevations, throughout.

Rosa setigera Michx. Prairie rose. Rare, roadsides, dry woods, low elevations. Rich Mountain (Blount Co.).

**Rosa wichuraiana* Crepin. Memorial rose. Rare; roadsides, old homesites, low elevations. Escaped near Twin Creeks (Sevier Co.). (PSW). Native to Asia.

Rubus (Gen. 3353)

Rubus allegheniensis Porter. Hairy blackberry. Occasional, fields, openings, roadsides, low elevations, throughout. Close to *R. alumnus* Bailey (see below).

Rubus alumnus Bailey. Blackberry. Occasional, fields, thickets, low elevations. Collected from Haywood and Blount Counties. Similar to *R. allegheniensis* Porter, but the inflorescence widened upward (cylindric-racemiform in *R. allegheniensis*). (Including *R. tennesseanus* Bailey).

Rubus argutus Link. Highbush blackberry. Frequent, fields, thickets, low elevations, throughout. (Including *R. argutus* var. *scissus* Bailey). I follow Davis et al. 1969 in treating *R. "paucillus"* as a shade form of *R. argutus* (one collection: Jennison 4258 at GRSM, TENN). Close to *R. jennisonii* (see below).

Rubus canadensis L. Smooth blackberry. Frequent, open woods, thickets, balds, low to high elevations, throughout.

ROSACEAE (Cont.)

- Rubus enslenii* Tratt. Enslen dewberry. Scarce, thickets, low elevations. Collected from Blount and Cocke Counties. (*R. flagellaris* Willd. in R). This species is close to *R. flagellaris* Willd., but the terminal leaflets are obovate to oblong with straight sides below the middle (ovate and more sharply toothed in *R. flagellaris*.)
- Rubus flagellaris* Willd. Northern dewberry. Occasional, usually dry or sandy woods, thickets, low elevations, throughout. (Including *R. baileyanus* Britt.).
- Rubus hispidus* L. Swamp dewberry. Scarce, wet to dry thickets, low elevations Western GRSM (Blount Co.). (Including *R. hispidus* var. *obovalis* (Michx.) Fern. of Hoffman's list).
- Rubus idaeus* var. *canadensis* Richards. American red raspberry. Scarce, moist woods openings, high elevations. Clingmans Dome area (Sevier and Swain Cos.).
- Rubus jennisonii* Bailey. Jennison's blackberry. Occasional, thickets, low elevations. Collected from Blount and Sevier Counties (type locale in GRSM). (Not in R). Similar to *R. argutus* Link., but the leaves are thick and dry below to a light tan, thus contrast with the darker brown of upper leaf surfaces in herbarium specimens. Although Davis et al. (1969) described the primocane leaves as glabrous beneath, the type specimens are clearly hairy (at GRSM, TENN) on the undersurface of both primocane and floricanes leaves. (*R. "jennisonianus"* in Hoffman's list and one some herbarium sheets).
- Rubus occidentalis* L. Black raspberry. Occasional, fields, thickets, low elevations, probably throughout but collected from Blount and Swain Counties. Plants with yellow mature fruits are segregated as *R. occidentalis* f. *pallidus* (Bailey) Robins. (One collection: Greenbrier area, Sevier Co.; Cain, unnumbered, at TENN).
- Rubus odoratus* L. Purple-flowering raspberry. Frequent, moist thickets, low to high elevations, throughout.
- **Rubus phoenicolasius* Maxim. Wineberry. Rare, openings, low elevations. A single collection from 1977: "Tight Run" (no other label data). Native to E. Asia.
- Rubus trux* Ashe. Truculent blackberry. Scarce or overlooked, thickets, low elevations. Specimens (not seen) from GRSM are cited in Davis et al. (1969).

Sorbus (Gen. 3338)

- Sorbus americana* Marsh. American mountain-ash. Common, moist woods, high elevations, throughout but less common in the Silers Bald to Gregory Bald (western) end of the park.

Spiraea (Gen. 3319)

- **Spiraea prunifolia* Sieb. & Zucc. Spiraea. Scarce, persistent after cultivation at old homesites, low elevations. (Not in R). Native to E. Asia.
- **Spiraea vanhouttei* (Briot) Zab. Van-houtte's spiraea. Scarce, persistent after cultivation at old homesites, low elevations. (Not in R). Horticultural origin.

ROSACEAE (Cont.)

Spiraea virginiana Britton. Virginia spiraea. Rare, streamside thicket, low elevations. Lower Abrams Creek (Blount Co.) only, where discovered by Tom Patirck and the author (White 1982). Shanks (1952) cited Blount Co. specimens at the U.S. National Herbarium and Gray Herbarium.

Waldsteinia (Gen. 3363)

Waldsteinia fragarioides var. *parviflora* (Small) Fern. Barren strawberry. Scarce, moist woods, thickets, low elevations. Currently known from Lower Abrams Creek, Hurricane Creek, White Oak Sink, and near Gatlinburg. (Included in *W. fragarioides* (Michx.) Tratt. in R).

RUBIACEAE (Fam. 161)

Cephalanthus (Gen. 8230)

Cephalanthus occidentalis L. Buttonbush. Scarce, wet thickets, low elevations. Cades Cove and Lower Abrams Creek (Blount Co.).

Diodia (Gen. 8471)

Diodia teres Walt. Rough buttonweed. Occasional, fields, roadsides, lawns, marshes, low elevations, probably throughout but collected from Blount and Sevier Counties.

Diodia virginiana L. Virginia buttonweed. Occasional, fields, roadsides, lawns, marshes, low elevations, probably throughout but collected from Blount and Sevier Counties.

Galium (Gen. 8486)

Galium aparine L. Cleavers. Common, mesic woods and thickets, low to mid-elevations, throughout.

Galium circaezans Michx. Wild licorice. Occasional, mesic to submesic woods, low elevations, probably throughout but collected from Blount and Swain Counties.

Galium lanceolatum Torr. Yellow wild licorice. Occasional, submesic woods, low to mid-elevations, throughout.

Galium latifolium Michx. Broad-leaved bedstraw. Occasional, submesic woods, low to mid-elevations, throughout.

Galium obtusum Bigel. Blunt-leaved bedstraw. Rare, marshes, low elevations. Collected from Cades Cove (Blount Co.; Jennison and Fleetwood 1830 at GRSM and TENN).

**Galium pedemontanum* All. Narrow bedstraw. Rare, fields and thickets, low to mid-elevations. Two collections (Haywood and Sevier Cos.). (PSW). Native to Europe. (Rogers and Bowers 1973).

Galium pilosum Ait. var. *pilosum*. Hairy bedstraw. Frequent, dry woods, fields, thickets, low to mid-elevations, probably throughout but collected from Blount, Sevier, and Swain Counties.

Galium pilosum var. *puncticulosum* (Michx.) T. & G. Hairy bedstraw. Occasional, with the typical variety. Collected from Blount and Swain Counties. (Included in *G. pilosum* Ait. in R).

RUBIACEAE (Cont.)

Galium tinctorium L. Marsh bedstraw. Frequent, streamside thickets, marshes, low elevations, probably throughout but collected from Blount and Sevier Counties.

Galium triflorum var. *asprelliforme* Fern. Fragrant bedstraw. Common, moist woods, low to high elevations (increasing in importance at higher elevations). (Included in *G. triflorum* Michx. in R).

Houstonia (Gen. 8141)

Houstonia caerulea L. Bluets, Quaker ladies. Collected only from Cades Cove and Greenbrier but to be expected elsewhere. Fields, roadsides, low elevations.

Houstonia longifolia Gaertner. Long-leaved bluets. Frequent, submesic to subxeric woods, low to mid-elevations. Collected from Blount County.

Houstonia purpurea L. Woodland bluets. Common, mesic to submesic woods, low to mid-elevations, throughout.

Houstonia serpyllifolia Michx. Thyme-leaved bluets. Common, moist woods, streamsides, low to high elevations, throughout. Plants with white flowers are *H. serpyllifolia* f. *alba* Alex.

Houstonia tenuifolia Nutt. Narrow-leaved bluets. Frequent, submesic to xeric woods, low to mid-elevations, throughout.

Mitchella (Gen. 8451)

Mitchella repens L. Partridgeberry. Common, submesic to subxeric woods, low to mid-elevations, throughout.

Sherardia (Gen. 8482)

**Sherardia arvensis* L. Field madder. Rare, low elevations, fields, roadsides (Blount Co.). (PSW). Native to Europe.

RUTACEAE (Fam. 88)

Zanthoxylum (Gen. 3990)

**Zanthoxylum americanum* Mill. Prickly-ash. Rare introduction, old homesites, Cades Cove, Little Greenbrier (Blount, Sevier Cos.). Native to E. North America but introduced in GRSM.

SALICACEAE (Fam. 41)

Populus (Gen. 1872)

Besides the species listed below, *Populus grandidentata* Michx. has been attributed to the park by some authors. A check of herbarium specimens and field sites revealed, however, that the leaf teeth are irregular, leaves are whitened below with persistent hairs, and the petioles are round in cross-section. Hence, these specimens are *P. alba* and *P. canescens*.

SALICACEAE (Cont.)

- **Populus alba* L. Silver poplar. Occasional, persistent and spreading at old homesites, low elevations. Native to Europe.
- **Populus candicans* Aiton. Balm of Gilead. Rare, persistent at old homesites, low elevations. Horticultural origin.
- **Populus canescens* Sm. Gray poplar. Occasional, persistent and spreading at old homesites, low elevations. Horticulturally derived from a European tree. (Not in R).
- **Populus deltoides* Marsh. Eastern cottonwood. Rare, persistent at old homesites, low elevations. Native to eastern U.S. beyond the park's boundaries.
- **Populus nigra* var. *italica* Muenchh. Lombardy poplar. Rare introduction, old homesites, low elevations. A horticulturally produced variety of a European tree. All trees are male; hence spread is limited to vegetative reproduction. Reported first by Stupka (1964) (TENN). (Not in R).

Salix (Gen. 1873)

- **Salix alba* L. White willow. Rare introduction, old homesites, low elevations. Native to Europe.
- **Salix babylonica* L. Weeping willow. Rare introduction, old homesites, low elevations. Native to Eurasia. First reported by Stupka (1964) (TENN).
- Salix caroliniana* Michx. Carolina willow. Rare, streamsides, low elevations. In the park, only known from Lower Abrams Creek (Blount Co.). (PSW.-Hoffman's earlier report based on trees outside the park).
- Salix humilis* Marsh. var. *humilis*. Prairie willow. Occasional, moist to dry fields, thickets, balds, low to mid-elevations, throughout. (Including *S. humilis* var. *rigiduscula* (And.) Rub. & Fern. of Hoffman (1964)).
- Salix humilis* var. *microphylla* (Anderss.) Fern. Dwarf willow. Scarce, Mountain summits (Spruce Mountain) and balds (Gregory Bald, Parsons Bald), mid- to high elevation. Distinctive, narrow and gray-leaved shrub. (*Salix tristis* Ait.; included in *S. humilis* Marsh in R).
- Salix nigra* Marsh. Black willow. Frequent, streamsides, low elevations, throughout.
- Salix sericea* Marsh. Silky willow. Frequent, wet ground, streamsides, low to high elevations, throughout.

SANTALACEAE (Fam. 51)

Pyrularia (Gen. 2113)

- Pyrularia pubera* Michx. Buffalo-nut, oil-nut. Common, mesic to submesic woods, low to mid-elevations, throughout. Parasitic shrub, the roots fused to those of other trees; a favored deer browse item.

SAXIFRAGACEAE (Fam. 79)

Astilbe (Gen. 3177)

- Astilbe biternata* (Vent.) Britt. False goat's beard. Frequent, rich moist woods, coves, low to mid-elevations, throughout.

SAXIFRAGACEAE (Cont.)

Boykinia (Gen. 3185)

Boykinia aconitifolia Nutt. Brook saxifrage. Scarce, rock crevices, streamsides, low elevations. Known only from two locales at present: Rabbit Creek - Lower Abrams Creek area (Blount Co.) and vicinity of Ravensford (Swain Co.).

Chrysosplenium (Gen. 3199)

Chrysosplenium americanum Schwein. Golden saxifrage. Occasional, streamsides, seeps, low to high elevations, throughout.

Decumaria (Gen. 3222)

Decumaria barbara L. Climbing hydrangea. Rare, streamside, low elevation. Known only from one locale near Big Spring Cove (Blount Co.). (PSW).

Heuchera (Gen. 3195)

Heuchera americana L. Alumroot. Frequent, rocky woods, low to mid-elevations, throughout. A variable species, here interpreted to include H. americana var. hirsuticaulis (Wheelock) Rosend., Butt. & Lak. (petioles hirsute) and H. americana var. interior Rosend., Butt. & Lak.

Heuchera longiflora Rydb. Alumroot. Scarce, rocky woods, low to mid-elevations. Collected from Cocke and Haywood Counties. (H. longiflora var. aceroides (Rydb.) Rosend., Butt. & Lak. in R).

Heuchera villosa Michx. Hairy alumroot. Frequent, rocky woods, low to mid-elevations, throughout. A variable species, here interpreted to include H. villosa var. intermedia Rosend., Butt. & Lak. and H. villosa var. macrorhiza (Small) Rosend., Butt. & Lak.

Hydrangea (Gen. 3217)

Hydrangea arborescens L. ssp. arborescens. Wild hydrangea. Common, mesic to submesic woods, streamsides, low to high elevations, throughout. Leaves definitely green beneath.

Hydrangea arborescens ssp. discolor (Seringe) McClintock. Gray-leaf hydrangea. Rare, moist woods, mid-elevations. A single collection: Mt. LeConte (Sevier Co.; Kinsey s.n. at TENN). The leaves are hairy and glaucous beneath but not bright white and felted below (as in H. radiata Walter).

*Hydrangea paniculata Siebold. Hydrangea. Rare, persistent after cultivation, low elevations. Collected from Swain County. (PSW). Native to E. Asia.

Hydrangea radiata Walter. White-leaf hydrangea. Occasional, mesic to subxeric woods, streamsides, low to mid-elevations. Western GRSM (Blount Co.). (H. arborescens ssp. radiata (Walter) McClintock in R).

Itea (Gen. 3231)

Itea virginica L. Sweet-spire, tassel-white. Scarce, rocky streamsides and marshes. Known only from Cades Cove and Lower Abrams Creek.

SAXAFRAGACEAE (Cont.)

Mitella (Gen. 3198)

Mitella diphylla L. Bishop's cap. Frequent, rich moist woods, coves, stream-sides, low to mid-elevations, throughout.

Parnassia (Gen. 3203)

Parnassia asarifolia Vent. Grass-of-Parnassus. Rare, seeps, landslide scars, wet cliffs, high elevations (Sevier Co.).

Penthorum (Gen. 3173)

Penthorum sedoides L. Ditch stone-crop. Infrequent, marshy ground, low elevations. The only documented populations are in Blount and Sevier Counties.

Philadelphus (Gen. 3208)

Philadelphus hirsutus var. *nanus* Hu. Small-flowered hairy mock-orange. Scarce, rocky woods, streambanks, low elevations. Western GRSM (Blount Co.). (The variety is not in R).

Philadelphus inodorus var. *grandiflorus* (Willd.) Gray. Large-flowered mock-orange. Scarce, introduction, persistent at old homesites, low elevations. (The variety is not in R).

Philadelphus inodorus var. *strigosus* Beadle. Mock-orange. Scarce, rocky woods, low elevations. Collected from Blount and Sevier Counties. (The variety is not in R).

Philadelphus sharpianus Hu. Sharp's mock-orange. Rare, dry rocky woods, low elevations. Lower Abrams Creek (Sharp 278 at TENN is one of two types designated by Hu (1956)). The hypanthium is glabrous; otherwise close to *P. hirsutus* Nutt. (Not in R).

Ribes (Gen. 3249)

Ribes cynosbati L. Prickly gooseberry. Occasional, moist rocky woods, coves, generally at mid-elevations.

Ribes glandulosum Grauer. Skunk currant. Frequent, moist rocky woods, high elevations.

**Ribes odoratum* Wendl. Missouri currant. Rare, persistent at old homesites, low elevations. The herbarium specimens are from Ravensford (Swain Co.) and Elkmont (Sevier Co.). (Not in R). Native to Midwest west of Miss. River (ND to Texas).

Ribes rotundifolium Michx. Round-leaved currant. Frequent, moist woods, mid-to high elevations.

During ca 1940 to 1950 there was a White Pine blister rust control program in the park in which *Ribes* bushes were systematically searched for and destroyed over large areas of the park, especially near areas where White Pine was important. Although some reports survive (for example, some cite thousands of acres searched and thousands of bushes destroyed), the precise impact of this program is difficult to ascertain. Documentation seems incomplete.

SAXIFRAGACEAE (Cont.)

Saxifraga (Gen. 3189)

Saxifraga careyana Gray. Carey's saxifrage. Scarce, moist outcrops, streamsides, low to high elevations. Scattered locales in all five counties. Two similar Saxifrages have never been found in the park but are to be looked for: *S. caroliniana* Gray and *S. virginensis* Michx.

Saxifraga michauxii Britt. Michaux's saxifrage. Common, cliffs, landslide scars, rocky woods, streamsides, trailsides, high elevations, central and eastern GRSM.

Saxifraga micranthidifolia (Haw.) Britt. Brook lettuce. Common, seeps, streams, wet rocks, low to mid-elevations, throughout.

Tiarella (Gen. 3193)

Tiarella cordifolia L. Foamflower. Common, moist woods, streamsides, low to high elevations, throughout. (Including *T. cordifolia* var. *austrina* Lakela). See comments under the next species.

Tiarella wherryi Lakela. Wherry's foamflower. Apparently scarce, moist woods, low elevations. (*T. cordifolia* var. *collina* Wherry in R). The only collections of *T. wherryi* I have seen from GRSM are ambiguous (Jennison 2255, vicinity of Deals Camp, Blount Co.)--the plant should be looked for and good collections made.

The following key may be used to separate the two taxa (adapted from Fernald 1950, Radford et al. 1968, and a typescript key, GRSM Herbarium):

- Stolons present; capsule valves gradually tapering to slender styles; sepals 2.2-3.8 mm long, usually greater than 1 mm wide, petals broadly elliptic or lanceolate *T. cordifolia*
- Stolons absent; capsule valves broadly rounded; sepals 1.5 mm long, usually less than 1 mm wide, petals narrowly lanceolate *T. wherryi*

SCROPHULARIACEAE (Fam. 153)

Agalinis (Gen. 7604)

Agalinis purpurea (L.) Pennell. Purple gerardia. Infrequent, moist thickets, fields, low elevations. Collected from Blount and Sevier Counties. (*Gerardia purpurea* L.). The pedicels are shorter than the calyx tube (in all other species the pedicels are longer).

Agalinis setacea (Walt.) Raf. Narrow-leaved gerardia. Infrequent, dry woods, trailsides, low elevations. Collected from western GRSM (Blount and Sevier Cos.). *Gerardia setacea* (Walt.) J. F. Gmel.). The corolla throat is open and lanose within (Closed, glabrous within in *A. tenuifolia* (Vahl.) Raf.).

Agalinis tenuifolia (Vahl.) Raf. Slender gerardia. Occasional, dry woods, trailsides, low to mid-elevations, throughout. (*Gerardia tenuifolia* Vahl.). See note under *A. setacea* (Walt.) Raf.

SCROPHULARIACEAE (Cont.)

Aureolaria (Gen. 7604)

- Aureolaria flava* (L.) Farwell. Yellow gerardia. Frequent, submesic to subxeric woods, low to mid-elevations, throughout. (*Gerardia flava* L.) This and the next species are smooth (see note below).
- Aureolaria laevigata* (Raf.) Raf. Smooth gerardia. Frequent, submesic to subxeric woods, low to mid-elevations, throughout. (*Gerardia laevigata* Raf.). The leaves are rarely lobed (lower leaves pinnately lobed in *A. flava* (L.) Farwell).
- Aureolaria pectinata* (Nutt.) Pennell. Cut-leaved gerardia. Occasional, dry woods, low to mid-elevations, western GRSM (Blount Co.). This and *A. pedicularia* have pectinate leaves and glandular pubescent stems. *A. pectinata* is glandular pubescent throughout (*A. pedicularia* (L.) Raf. is glabrous in upper parts). Two collections were previously determined as *A. pedicularia*: Sharp S-487 (at GRSM and TENN) and Bechtel, unnumbered (8/21/31) (at TENN). However, these are glandular throughout and no other characteristic suggests they are *A. pedicularia* rather than *pectinata*. Gleason (1952) has commented that *pedicularia* and *pectinata* intergrade in the South.
- Aureolaria virginica* (L.) Pennell. Downy false-foxglove. Scarce, dry woods, low elevations. Collected from Blount County (Jennison and Smith 4320 at TENN). (*Gerardia virginica* (L.) BSP. The stem is hairy (glabrous in *A. flava* (L.) Farwell and *A. laevigata* (Raf.) Raf.).

Castilleja (Gen. 7631)

- Castilleja coccinea* (L.) Spreng. Indian paint-brush. Occasional, roadsides, thickets, balds, mid- to high elevations. All the collections are from the North Carolina side (Haywood and Swain Cos.).

Chelone (Gen. 7507)

- Chelone glabra* L. var. *glabra*. White turtlehead. Infrequent, marshes, low elevations. Cades Cove (Blount Co.). The variety is more frequent than typical *C. glabra* L.
- Chelone glabra* var. *elatio*r Raf. Broad-leaved white turtlehead. Frequent, seeps, streamsides, marshes, low to mid-elevations, throughout. (Included in *C. glabra* L. in R). The leaves are up to 6 cm wide, and the corolla is purplish-pink toward the tip (leaves typically 2-4 cm wide, and the corolla entirely white in *C. glabra* var. *glabra*). (Including *C. chlorantha* Penn. & Wherry).
- Chelone lyonii* Pursh. Pink turtlehead. Frequent, seeps, streamsides, low to high elevations, throughout.
- Chelone obliqua* L. Lance-leaved turtlehead. Rare; known from a single collection: Clingmans Dome (Swain County) (Beardslee and Kofoed, unnumbered, 8/8/1891, at NC State). The specimen could not be absolutely determined using modern floristic manuals--hence, further field work is needed.

Digitalis (Gen. 7593)

- **Digitalis purpurea* L. Fox-glove. Rare introduction, fields, low elevations. Hoffman collected this species near Gatlinburg (Sevier Co.). (Not in R). Native to Europe.

SCROPHULARIACEAE (Cont.)

Gratiola (Gen. 7542)

Gratiola neglecta Torr. Hedge-hyssop. Rare, marshes, low elevations. Cades Cove (Blount Co.).

Gratiola virginiana L. Virginia hedge-hyssop. Rare, marshes, low elevations. Cades Cove (Blount Co.). (PSW).

Linaria (Gen. 7480)

Linaria canadensis (L.) Dumont. Toadflax. Scarce, roadsides, dry woods, low elevations. Collected from Swain County.

**Linaria vulgaris* Mill. Butter-and-eggs. Scarce, roadsides, low to mid-elevations. Collected from Sevier and Haywood Counties. Native to Europe.

Lindernia (Gen. 7562)

Lindernia dubia (L.) Pennell. False pimpernell. Scarce, marshes, pond shores, streamsides, low elevations. The collections are from Cades Cove (Blount Co.).

Mazus (Gen. 7525)

**Mazus japonicus* (Thunb.) Ktze. Mazus. Scarce, lawns, low elevations. Collected from Sevier County. Native to E. Asia.

Melampyrum (Gen. 7635)

Melampyrum lineare var. *americanum* (Michx.) Beau. Cow wheat. Common, dry woods, thickets, heath balds, low to mid-elevations, throughout. Including *M. lineare* var. *latifolium* Bart. of Hoffman's list. (Included in *M. lineare* Desr. in R).

Mimulus (Gen. 7524)

Mimulus alatus Ait. Winged monkey flower. Infrequent, wet meadows, streamsides, low elevations. Probably throughout but collected from Sevier Co.

Mimulus ringens L. Monkey flower. Frequent, wet meadows, seeps, streamsides, low to mid-elevations, throughout.

Paulownia (Gen. 7513)

**Paulownia tomentosa* (Thunb.) Steud. Princess-tree. Occasional, disturbed ground, fields, roadsides; also spreading to disturbed ground remote from old homesites and roads, as on burn scars in western GRSM, where noted by Mark Harmon. Native to E. Asia.

Pedicularis (Gen. 7648)

Pedicularis canadensis L. Wood betony. Common, submesic to subxeric woods, low to high elevations, throughout.

SCROPHULARIACEAE (Cont.)

Penstemon (Gen. 7508)

Penstemon canescens Britt. Hairy beard-tongue. Frequent, dry woods, banks, low to mid-elevations, throughout. Plants with sepals less than 4.5 mm long and only half as long as the mature capsule have been segregated as *P. brevisepalus* Pennell (*P. canescens* ssp. *brevisepalus* (Pennell) Crosswhite). However, given variation in this character and complexity in *Penstemon* in general, this taxon is not retained here. In particular, younger material seems to always have sepals to 4 mm long; older material (full anthesis) has sepals 4-5 mm long. In the fruiting specimens examined, the sepals are frequently one-half to two-thirds the length of the capsule. However, this too seems to vary with plant maturity.

**Penstemon digitalis* Nutt. Large-flowered beard-tongue. Rare, fields, low elevations. A single collection: Blount County (Cain, unnumbered, at TENN). Native to midwestern U.S.

Penstemon laevigatus Solander ex Aiton. Smooth beard-tongue. Scarce, dry woods, thickets, low elevations, western GRSM (Blount Co.).

Penstemon smallii Heller. Small's beard-tongue. Occasional, rocky woods, mid-elevations. The collections are from Haywood County (Jennison and McDowell 4445 at GRSM, TENN; Sharp S-04123 at GRSM, TENN).

Scrophularia (Gen. 7505)

Scrophularia marilandica L. Figwort. Infrequent, mesic to submesic thickets, low to high elevations, throughout.

Verbascum (Gen. 7460)

**Verbascum blattaria* L. Moth mullein. Infrequent, roadsides, fields, open ground, low to high elevations, probably throughout. Native to Europe.

**Verbascum thapsus* L. Common mullein. Frequent, roadsides, fields, dry rocky slopes, low to mid-elevations, throughout. Native to Europe.

Veronica (Gen. 7579)

Veronica anagallis-aquatica L. Water speedwell. Scarce, seeps, streamsides, low elevations. The collections are from vicinity of Elkmont and near Laurel Falls trail (Sevier Co.).

**Veronica arvensis* L. Corn speedwell. Occasional, old fields, roadsides, low elevations. Collected from Blount and Sevier Counties. Native to Europe.

**Veronica officinalis* L. Common speedwell. Frequent, disturbed soil, road- and trailsides, low to high elevations, throughout. Native to eastern U.S. (south to TN and NC), Canada, and Europe.

Veronica peregrina L. Purslane speedwell. Occasional, old fields, low elevations. Collected from Sevier County.

**Veronica persica* Poir. Speedwell. Rare, old field, low elevation. Known from a single collection at Cherokee Orchard (Sevier Co.). (PSW). Native to Eurasia.

**Veronica serpyllifolia* L. Thyme-leaved speedwell. Frequent, lawns, roadsides, disturbed soil, widely distributed. Native to Europe.

SCROPHULARIACEAE (Cont.)

Veronicastrum (Gen. 7579A)

Veronicastrum virginicum (L.) Farw. Culver's root. Rare; known from a single site along the trail to Pretty Hollow Gap (Haywood Co.) (PSW).

SIMAROUBACEAE (Fam. 89)

Ailanthus (Gen. 4124)

*Ailanthus altissima (Mill) Swingle. Tree-of-heaven. Scarce, thickets, old homesites, disturbed areas, low elevations. Introduced from E. Asia.

SOLANCEAE (Fam. 152)

Datura (Gen. 7415)

*Datura stramonium L. Jimson weed. Infrequent, roadsides, fields, low elevations, probably throughout but collected from Blount and Sevier Counties.

Lycopersicon (Gen. 7407A)

*Lycopersicon esculentum Miller. Tomato. Scarce, widely scattered locales, low elevations. Probably does not persist, but evidently maintained by import of seeds by hikers and picnickers.

Nicandra (Gen. 7377)

*Nicandra physalodes (L.) Pers. Apple of Peru. Infrequent, roadsides, old fields, low elevations. Collected from Blount, Sevier, and Swain Counties. Native to Peru.

Physalis (Gen. 7401)

Physalis angulata L. Angular ground-cherry. Rare, roadsides, low elevations. Along Rt. 73, Sevier County (PSW).

Physalis pruinosa L. Strawberry-tomato. Rare, roadsides, low elevations. Lower Abrams Creek (Blount Co.; Sharp and Sierk 20967 at TENN and GRSM). (P. pubescens var. grisea Waterfall in R).

Physalis pubescens L. Hairy ground-cherry. Rare, roadsides, low elevations. Lower Abrams Creek (Blount Co.; Sharp and Sierk 20972 at GRSM).

Physalis subglabrata Mackenz. & Bush. Smooth ground-cherry. Rare, roadsides, low elevations. A single collection: Baxter Branch, Haywood County (Jennison and Bain 1140 at TENN). (P. virginiana var. subglabrata (Mackenz. & Bush) Waterfall in R).

Physalis virginiana Mill. Virginia ground-cherry. Scarce, dry woods, thickets, roadsides, low elevations, western GRSM (Blount Co.).

Solanum (Gen. 7407)

Solanum carolinense L. Horse-nettle. Frequent, old fields, thickets, low to mid-elevations, throughout.

SOLANCEAE (Cont.)

Solanum ptycanthum Dun. Nightshade. Infrequent, fields, roadsides, low elevations, probably throughout. (Including *S. americanum* Mill. of Hoffman 1964; *S. nigrum* L. of Hoffman 1966b was in error).

STAPHYLEACEAE (Fam. 101)

Staphylea (Gen. 4665)

Staphylea trifolia L. Bladdernut. Rare, limestone outcrops, thickets, low elevations (Blount Co.).

STYRACACEAE (Fam. 140)

Halesia (Gen. 6410)

Halesia carolina L. Silverbell. Common, mesic to submesic woods, cove hardwoods, northern hardwoods, low to mid-elevation, throughout. Large tree in the Great Smoky Mountains, and this has led to its receiving varietal rank as *Halesia carolina* var. *monticola* Rehd. However, there are apparently no other morphological grounds for maintaining this taxon.

SYMPLOCACEAE (Fam. 139)

Symplocos (Gen. 6418)

Symplocos tinctoria (L.) L'Her. Sweetleaf. Rare, known from a single station in GRSM (streamside thicket, 1,800 ft), now inundated by Fontana Dam.

THEACEAE (Fam. 110)

Stewartia (Gen. 5152)

Stewartia ovata (Cav.) Weath. Mountain stewartia. Infrequent, streamsides, thickets, low to mid-elevations.

TILIACEAE (Fam. 108)

Tilia (Gen. 4964)

Tilia americana L. American basswood. Apparently rare, rich moist woods, mid-elevations. Leaves smooth or with simple trichomes only. There has been much controversy in the past as to the presence of this taxon in GRSM. Certainly, there is overwhelming variation among basswoods in leaf pubescence and sometimes even among leaves from one tree. However, a few herbarium and field specimens are hairless or have only simple trichomes. Pending further monographic work, these are treated here as *Tilia americana*, in accordance with Radford et al. (1968).

Tilia heterophylla Vert. White basswood. Common, rich moist woods, coves, low to mid-elevations. At least some of the leaf trichomes stellate; in well-marked specimens the leaves are densely clothed beneath with white leaves.

ULMACEAE (Fam. 47)

Celtis (Gen. 1898)

Celtis laevigata Willd. Smooth hackberry. Rare, thickets, streamsides, and limestone woods, low elevations (Blount Co.). The herbarium material from GRSM has toothed leaves and hence is *C. laevigata* var. *smallii* (Beadle) Sarg. However, *Celtis* shows much intragradation in this area, and full resolution of these taxa awaits monographic treatment.

Celtis occidentalis L. Common hackberry. Rare, thickets and roadsides, low elevations.

Celtis tenuifolia Nutt. Dwarf hackberry. Scarce, thickets, roadsides, and limestone outcrops, low elevations (Blount Co.). The herbarium material has rough, hairy, thick-textured leaves and hence is *C. tenuifolia* var. *georgiana* (Small) Fern. & Schub. (*C. occidentalis* var. *georgiana* (Small) in R). See note under *C. laevigata* above.

Ulmus (Gen. 1896)

Ulmus alata Michx. Winged elm. Common, streamsides, old homesites, and even some dry limestone outcrops (Cades Cove), low elevations.

Ulmus americana L. American elm. Frequent, streamsides, old fields and roadsides, low elevations.

Ulmus rubra Muhl. Slippery elm. Infrequent, streamsides, roadsides, and limestone woods, low elevations.

UMBELLIFERAE (See APIACEAE)

URTICACEAE (Fam. 50)

Boehmeria (Gen. 1990)

Boehmeria cylindrica (L.) Sw. Button-hemp, false-nettle. Frequent, wet ground, streamsides, low to mid-elevations, throughout.

Laportea (Gen. 1980)

Laportea canadensis (L.) Wedd. Wood-nettle. Common, mesic woods, low to high elevations, throughout. The leaves are alternate; in *Urtica*, the true nettles, the leaves are opposite (*Urtica* has not yet been collected in GRSM).

Parietaria (Gen. 2007)

Parietaria pensylvanica Muhl. Pellitory. Rare, dry slopes, low elevations. Currently the only park locale is in Little River Gorge (Blount Co.). (PSW).

Pilea (Gen. 1984)

Pilea pumila (L.) Gray. Richweed, clearweed. Occasional, moist woods, streamsides, low elevations, throughout.

VALERIANACEAE (Fam. 164)

Valerianella (Gen. 8529)

Valerianella radiata (L.) Dufr. Corn salad. Frequent, roadsides, fields, low elevations, throughout. Other species of this genus have been collected in the vicinity of GRSM and probably will eventually be found within the park.

VERBENACEAE (Fam. 150)

Callicarpa (Gen. 7177)

Callicarpa americana L. Beauty-berry. Rare, streamsides and dry slopes, low elevations. Known only from Cades Cove, vicinity Tremont, Little River (near the Sinks), and Lower Abrams Creek (Blount Co.).

Verbena (Gen. 7138)

**Verbena brasiliensis* Vell. Blue vervain. Rare, roadside, low elevation. Collected near park boundary, above Topoco Lake, Sharp 41367 (Swain Co.; Hoffman 1966b). Native to S. America.

Verbena urticifolia L. White vervain. Occasional, fields, roadsides, low elevations, probably throughout but collected from Blount and Sevier Counties.

VIOLACEAE (Fam. 115)

Hybanthus (Gen. 5271)

Hybanthus concolor (T. F. Forst.) Spreng. Green violet. Scarce, rocky limestone woods, low elevations. Known only from western GRSM (Blount Co.).

Viola (Gen. 5274)

Viola blanda Willd. Sweet white violet. Frequent, moist woods, low to mid-elevations, throughout. *V. incognita* Brainerd and *V. macloskeyi* ssp. *pallens* (Banks ex DC) C. L. Hitchcock are similar.

Viola canadensis L. var. *canadensis*. Violet. Frequent, mesic woods, low to high elevations, throughout.

Viola canadensis var. *corymbosa* Nutt. ex Torr. & Gray. Canadian violet. Frequent, rich woods, low to high elevations, throughout. The plants form large patches in this variety due to the presence of stolons (absent in var. *canadensis* (see Uttal 1967)).

Viola conspersa Reichenb. Dog violet. Occasional, moist woods, thickets, streamsides, low elevations, probably throughout but the collections are from Blount, Sevier, and Haywood Counties. One collection from the Cataloochee area (Jennison and Smith 3700 at GRSM and TENN) was originally determined as *V. walteri* House; however, it is glabrous and lacks trailing stems. Hence, it is treated as *V. conspersa*, albeit a young and unexpanded form of that species. This specimen does not key to *V. walteri* in any floristic manual, nor in Russell (1958). I must conclude that *V. walteri* is, at present, undocumented in the park flora.

VIOLACEAE (Cont.)

- Viola cucullata* Ait. Marsh blue violet. Frequent, moist woods, streamsides, marshes, low to mid-elevations, throughout. Intergrades with *V. papilionacea* Pursh.
- Viola emarginata* (Nutt.) Le Conte. Triangle-leaved violet. Occasional, fields, balds, low to high elevations, throughout. Close to, and not always easily distinguished from, *V. sagittata* Ait.
- Viola eriocarpa* var. *leiocarpa* Fern. & Wieg. Smooth yellow violet. Frequent, moist woods, low to mid-elevations, throughout. (*V. pensylvanica* var. *leiocarpa* (Fern. & Wieg.) Fern.). Contrary to the common name, this species sometimes bears hairs; some specimens, therefore, are difficult to separate from *V. pubescens* (which see).
- Viola fimbriatula* Sm. Northern downy violet. Infrequent, woods, fields, low to mid-elevations, throughout.
- Viola hastata* Michx. Halbred-leaved violet. Common, mesic to submesic woods, low to mid-elevations, throughout.
- Viola hirsutula* Brainerd. Southern wood violet. Infrequent, dry woods, low elevations. The collections are from Blount (Sharp S-493 at GRSM and TENN) and Sevier Counties (Jennison 3717 at GRSM). *V. hirsutula* is apparently less frequent than *V. sororia* Willd., with which it intergrades. *V. hirsutula* leaves are hairy above but glabrous beneath; *V. sororia* leaves are hairy on both surfaces, or if glabrous on the leaf blades, are hairy on the petiole.
- Viola incognita* Brainerd. Large-leaved violet. Frequent, moist woods, low to high elevations, throughout. (Included in *V. blanda* Willd. in R).
- Viola lanceolata* L. Lance-leaved violet. Scarce, moist thickets, fields, low elevations. The collections are from Cades Cove (Blount Co.). In the Carolinas this species has a coastal plain distribution (Radford et al. 1968).
- Viola macloskeyi* ssp. *pallens* (Banks ex DC.) C. L. Hitchcock. Northern white violet. Frequent, cool streamsides, seeps, mid- to high elevations, throughout. (*V. pallens* (Banks ex DC) Brainerd).
- **Viola odorata* L. Sweet violet. Scarce, lawns, roadsides, low elevations. Collected from Sevier County. Native to Europe. (Not in R).
- Viola papilionacea* Pursh. Common blue violet. Common, moist woods, thickets, streamsides, low to mid-elevations, throughout. Variable, intergrading with *V. cucullata* Ait. and *V. sororia* Willd. In *V. cucullata*, the beard of the lateral petals is knobbed (not thickened or clavate only in *V. papilionacea*); *V. sororia* is hairy on leaves and/or petioles (*V. papilionacea* is smooth). Some lightly hairy specimens, otherwise much resembling *V. papilionacea*, have been determined as *V. septentrionalis* Greene. However, given the variability of the *V. cucullata* - *papilionacea* - *sororia* complex in the parks, *V. septentrionalis* is rejected for the checklist. Other determinations rejected and placed in this complex are *V. affinis* LeConte and *V. latiuscula* Greene. These are all good species; their presence in the park is doubtful and cannot be verified by extant herbarium species.
- Viola pedata* L. var. *pedata*. Bird's foot violet. Apparently scarce in GRSM, but see the variety below. The upper two petals are dark purple.
- Viola pedata* var. *lineariloba* DC. Bird's foot violet. Common, dry woods, low to mid-elevations, throughout. Petals all lilac-purple (the common form in GRSM). (Not in R).

VIOLACEAE (Cont.)

- Viola primulifolia* L. Primrose-leaved violet. Scarce, wet fields, low elevations. Collected from Cades Cove (Blount Co.).
- Viola pubescens* Ait. Hairy yellow violet. Apparently rare, rich woods, low elevations. The only collection is from near Cherokee Orchard, Sevier County (Underwood 202 at TENN). Close to *V. eriocarpa*, but hairier. In *V. pubescens*, basal leaves are generally absent and cauline leaves are thicker and veinier than in *V. eriocarpa*. Some specimens are difficult to place--Underwood 202 itself has a basal leaf but is hairy.
- **Viola rafinesquii* Greene. Wild pansy. Frequent, moist thickets, fields, roadsides, low to mid-elevations, throughout. Native to Eurasia. (*V. kitaibeliana* var. *rafinesquii* (Greene) Fern.).
- Viola rostrata* Pursh. Beaked violet. Occasional, mesic woods, trailsides, low to mid-elevations, throughout.
- Viola rotundifolia* Michx. Early yellow violet. Common, mesic woods, low to high elevations, throughout.
- Viola sagittata* Ait. Arrow-leaved violet. Frequent, dry to moist woods, thickets, fields, balds, low to high elevations, throughout. Close to, and not always easily distinguished from, *V. emarginata* (Nutt) Le Conte.
- Viola sororia* Willd. Woolly blue violet. Common, mesic to subxeric woods, trailsides, low to mid-elevations. Variable, intergrading with *V. papilionacea* Pursh. *V. sororia* is pubescent; *V. papilionacea* is glabrous. (*Viola palmata* var. *sororia* (Willd.) Pollard in R).
- Viola stoneana* House. Stone's violet. Occasional, submesic woods, thickets, low to mid-elevations, throughout. Similar to *V. triloba* Schwein, but smooth. (*V. palmata* var. *triloba* (Schweinitz) Ging. ex DC in R).
- Viola striata* Ait. Pale violet. Occasional, mesic to submesic woods and thickets, low elevations, throughout.
- Viola triloba* Schwein. Three-lobed violet. Occasional, submesic woods, thickets, low to mid-elevations, throughout. A hairy plant (*V. stoneana* House is similar but smooth). (*V. palmata* var. *triloba* (Schweinitz) Ging. ex DC in R).
- Viola tripartita* var. *glaberrima* (DC.) Fern. Oval-leaved violet. Scarce, dry woods, low elevations. Two collections from Blount County: Upper Bird Creek (Jennison UT-290 at GRSM) and Garland Ridge (Jennison and Wallace 1685 at GRSM and TENN).

VITACEAE (Fam. 107)

Ampelopsis (Gen. 4916)

- **Ampelopsis arborea* (L.) Koehne. Pepper-vine. Rare, roadside, low elevation (Sevier Co.) This specimen is probably the result of spread from cultivated plants. (PSW). Native to southern and midwestern U.S.
- Ampelopsis cordata* Michx. *Ampelopsis*. Rare, thickets, low elevations (Blount Co.).

Parthenocissus (Gen. 4915)

- Parthenocissus quinquefolia* (L.) Planch. Virginia creeper. Frequent, thickets, mesic woods, low to mid-elevations. Plants with pubescent leaves have been segregated as *P. quinquefolia* f. *hirsuta* (Donn) Fern.

VITACEAE (Cont.)

Vitis (Gen. 4909)

- Vitis aestivalis* Michx. Summer grape. Common, thickets, roadsides and disturbed patches in woods, low to mid-elevations. Plants with nearly glabrous leaves have been segregated as V. aestivalis var. argentifolia (Munson) Fern.
- Vitis cinerea* Engelm. ex Millardet. Downy grape. Rare, limestone outcrops, low elevations (Blount Co.).
- Vitis labrusca* L. Fox grape. Scarce, streamsides, old homesites, low elevations. The leaves are so densely hairy beneath (felt-like) that the actual surface of the leaf is hidden--other species may be hairy beneath but the leaf surface is visible between the hairs.
- Vitis rotundifolia* Michx. Muscadine. Frequent, streamsides, roadsides, thickets, low elevations.
- Vitis vulpina* L. Frost grape. Common, thickets, roadsides, and disturbed patches in woods, low to mid-elevations. (Including V. baileyana Munson of Hoffman's list).

LITERATURE CITED

- Anonymous. 1937. Numerical catalogue of collections, flora, Great Smoky Mountains National Park. 202 pp. (Typescript).
- Ball, C. R. 1938. The willows of the southeastern states. *Castanea* 3:1-9.
- Barksdale, L. 1936. An artificial key to the orchids of the Great Smoky Mountains and the adjacent mountain territory. No pagination. (Typescript).
- Barksdale, L. 1938. The pedicellate species of *Trillium* found in the Southern Appalachians. *J. Elisha Mitchell Sci. Soc.* 54:271-296.
- Barksdale, L., and H. M. Jennison. 1935. A report on the flora found within an area of fifteen square yards atop High Rock Mountain, North Carolina. 3 pp. (Typescript).
- Baron, J., T. Dombrowski, and S. P. Bratton. 1975. The status of five exotic woody plants in the Tennessee District, Great Smoky Mountains National Park. USDI, National Park Service, Southeast Region Res./Resour. Manage. Rep. 2. 26 pp.
- Beatley, J. C. 1963. The sunflowers (genus Helianthus) in Tennessee. *J. Tenn. Acad. Sci.* 38:135-154.
- Billings, W. D., S. A. Cain, and W. B. Drew. 1937. Winter key to the trees of eastern Tennessee. *Castanea* 2:29-44.
- Blomquist, H. L. 1939. Grasses new to North Carolina. *Castanea* 4:50-55.
- Blomquist, H. L., and D. S. Correll. 1940. A county checklist of North Carolina ferns and fern allies. *J. Elisha Mitchell Sci. Soc.* 56: 63-105.
- Boggess, R. 1935. Ferns of the Smoky Mountain region. *Proc. West Va. Acad. Sci.* 8:56-58.
- Bratton, S. P., and P. S. White. 1980. Rare plant management: after preservation, what? *Rhodora* 82:49-75.
- Bryson, C. T. 1980a. A revision of the North American Carex section Laxiflorae. Ph. D. Dissertation, Mississippi State University. 191 pp.
- Bryson, C. T. 1980b. Noteworthy *Carex* records from the Great Smoky Mountains. *Castanea* 45:138-139.
- Cain, S. A., W. D. Billings, and W. B. Drew. 1937. A key to the flowering plants of eastern Tennessee. (No pagination). (Typescript).
- Cain, S. A., and L. R. Hesler. 1940. Harry Milliken Jennison, 1885-1940. *J. Tenn. Acad. Sci.* 15:173-176.

- Chester, E. W. 1975. Range extensions and first reports for some Tennessee vascular plants. *Castanea* 40:56-63.
- Committee for Tennessee Rare Plants. 1978. The rare vascular plants of Tennessee. *J. Tenn. Acad. Sci.* 53:128-133.
- Cooper, J. E., S. S. Robinson, and J. B. Funderburg. 1977. Endangered and treated plants and animals of North Carolina. North Carolina State Museum of Natural History. Raleigh. 444 pp.
- Correll, D. S. 1937. The orchids of North Carolina. *J. Elisha Mitchell Sci. Soc.* 53:139-172.
- Cronquist, A. 1980. Vascular flora of the Southeastern United States. Vol. 1. Asteraceae. University of North Carolina Press. Chapel Hill. 261 pp.
- Davis, H. A., A. M. Fuller, and T. Davis. 1969. Contributions toward the revision of the Eubati of Eastern North America. V. *Arguti*. *Castanea* 34:235-266.
- Dennis, W. M., D. H. Webb, B. E. Wofford, and R. Kral. 1980. State records and other recent noteworthy collections of Tennessee plants. III. *Castanea* 45:237-242.
- Duncan, W. H. 1975. Woody vines of the Southeastern United States. University of Georgia Press. Athens. 76 pp.
- Duncan, W. H., and T. M. Pullen. 1962. Lepidote Rhododendrons of the Southeastern United States. *Brittonia* 14:290-298.
- Fernald, M. L. 1950. Gray's manual of botany, 8th edition. American Book Co. New York. 1632 pp.
- Fosberg, F. R. 1961. Southern distribution of Botrychium oneidense and B. multifidum. *Am. Fern. J.* 51:175-180.
- Freeman, J. D. 1975. Revision of Trillium subgenus phyllantherum (Liliaceae). *Brittonia* 27:1-62.
- Galle, F. C. 1963. Azaleas on Gregory Bald, Blount County, Tennessee. 4 pp. (Typescript).
- Galle, F. C. 1974. Native and some introduced azaleas for southern gardens. American Horticultural Society. 28 pp.
- Gattinger, A. 1901. The flora of Tennessee and a philosophy of botany. Gospel Advocate Publishing Co. Nashville. 296 pp.
- Gaylon, W. L. 1928a. The Smoky Mountains and the plant naturalist. *J. Tenn. Acad. Sci.* 3(2):1-12.
- Gaylon, W. L. 1928b. Checklist of the trees and shrubs of eastern Tennessee. M. A. Thesis, University of Tennessee. Knoxville.

- Gleason, H. A. 1952. New Britton and Brown illustrated flora of the Northeastern United States and adjacent Canada. 3 vols. New York Botanical Garden. New York.
- Hardin, J. W. 1954. An analysis of variation within Magnolia acuminata L. J. Elisha Mitchell Sci. Soc. 70:298-312.
- Harper, R. M. 1947. Preliminary list of Southern Appalachian endemics. Castanea 12:100-112.
- Harper, R. M. 1948. More about Southern Appalachian endemics. Castanea 13:124-127.
- Hoffman, H. L. 1964. Check list of vascular plants of the Great Smoky Mountains. Castanea 29:1-45.
- Hoffman, H. L. 1966a. Notes on vascular plant families in the Great Smoky Mountains. Castanea 31:301-306.
- Hoffman, H. L. 1966b. Supplement to check list, vascular plants, Great Smoky Mountains. Castanea 31:307-310.
- Hoffman, H. L., R. E. Shanks, and A. J. Sharp. 1958. Flowering plants of the Great Smoky Mountains, checklist of families and genera. 14 pp. (Typescript).
- Horton, J. W. 1972. Studies of the Southeastern United States flora. IV. Polygonaceae. J. Elisha Mitchell Sci. Soc. 88:92-102.
- Huber, F. C., and J. A. DeLapp. 1977. Betula papyrifera var. cordifolia (Regel) Fernald. in Tennessee. Castanea 42:324-325.
- Hu, S. Y. 1954. A monograph of the genus Philadelphus. J. Arnold Arboretum 35:275-333.
- Jennison, H. M. 1929. A preliminary check-list of the spring wildflowers and ferns of Tennessee. J. Tenn. Acad. Sci. 4(2)(Suppl.):1-32.
- Jennison, H. M. 1933. Wildflowers of the Great Smokies--and their blooming seasons. Visitors Guide to East Tennessee and the Great Smoky Mountains National Park, Ed. 7, pages 8-9. E. Tennessee Automobile Club. Knoxville.
- Jennison, H. M. 1934. Calendar of plants and flowers in the Great Smokies. Visitors Guide to East Tennessee and the Great Smoky Mountains National Park. E. Tennessee Automobile Club. Knoxville.
- Jennison, H. M. 1935a. Notes on some plants of Tennessee. Rhodora 37:310-323.
- Jennison, H. M. 1935b. Trees of the Great Smoky Mountains Park (including, "Classified list of trees of Great Smoky Mountains"). 21 pp. (Typescript).
- Jennison, H. M. 1937a. Preliminary checklist of ferns and seed plants of the Great Smoky Mountains National Park. 54 pp. (Typescript).

- Jennison, H. M. 1937b. Album of wildflowers of the Great Smoky Mountains National Park. (No pagination).
- Jennison, H. M. 1938a. Trillium erectum var. blandum var. novum. Rhodora 40:485-486.
- Jennison, H. M. 1938b. A classified list of the trees of the Great Smoky Mountains National Park. 26 pp. (Typescript).
- Jennison, H. M. 1938c. The species of Trillium in the Great Smoky Mountains National Park and vicinity. 1 p. (Typescript).
- Jennison, H. M. 1939a. Flora of the Great Smokies. J. Tenn. Acad. Sci. 14:266-298.
- Jennison, H. M. 1939b. A preliminary catalog of the flowering plants and ferns of the Great Smoky Mountains National Park. 249 pp. (Typescript).
- Jones, R. L. 1980. A revision of Aster section Patentes (Compositae). Ph. D. Dissertation, Vanderbilt University. Nashville, Tennessee.
- Kowal, R. R., and T. M. Barkley. 1973. Senecio anonymus Wood, an earlier name for Senecio smallii Britt. Rhodora 75:211-219.
- Kral, R. 1976. A treatment of Delphinium for Alabama and Tennessee. Sida 6:243-265.
- Leonard, S. W. 1971. Additions to the flora of the Carolinas. J. Elisha Mitchell Sci. Soc. 87:97-100.
- Luer, C. A. 1975. The native orchids of the United States and Canada. New York Botanical Garden. Bronx, New York. 361 pp.
- Maddox, R. S. 1926. The trees of the Great Smokies. J. Tenn. Acad. Sci. 1:21-24.
- Mathews, J. F., R. L. Kologiski and T. L. Mellichamp. 1974. Additional records for the vascular flora of the Carolinas. Castanea 39:349-360.
- Miller, F. H. 1937. Simplified bud and twig key to the genera to be found in the Great Smoky Mountains National Park. (No pagination). (Typescript).
- Miller, F. H. 1939. Twig key to deciduous woody plants in winter. 232 pp. (Typescript).
- Miller, F. H. 1942. Vegetation map for the Great Smoky Mountains National Park. (Unpublished, GRSM Archives).
- Miller, F. H. n. d. Azaleas, violets, Trillium. (Illustrated keys, no pagination). (Typescript).
- Moran, R. C. 1981. A major range extension for Thelypteris simulata in the Southern Appalachians. Am. Fern. J. 71:121.
- Natella, D. W. 1973. Autecological investigations of Agave virginica L. M.S. Thesis, University of Tennessee. Knoxville. 92 pp.

- O'Dell, H. 1961. An addition to the list of ferns found growing naturally in Tennessee. *Am Fern. J.* 51:156.
- Parks, C. R., and J. W. Hardin. 1963. Yellow Erythroniums of the eastern United States. *Brittonia* 15:245-259.
- Pittillo, J. D., and T. E. Govus. 1978. A manual of important plant habitats of the Blue Ridge Parkway. Western Carolina University. Cullowhee, North Carolina. (No pagination).
- Pittillo, J. D., J. H. Horton, and K. W. Greenlee. 1969. Additions to the vascular flora of the Carolinas. I. *J. Elisha Mitchell Sci. Soc.* 85:18-22.
- Pittillo, J. D., J. H. Horton, and K. E. Herman. 1972. Additions to the vascular flora of the Carolinas. II. *J. Elisha Mitchell Sci. Soc.* 88:144-152.
- Pittillo, J. D., W. H. Wagner, Jr., D. R. Farrar, and S. W. Leonard. 1975. New pteridophyte records in the Highland Biological Station area, Southern Appalachians. *Castanea* 40:263-272.
- Pringle, J. S. 1967. Taxonomy of Gentiana, section Pneumonanthe, in eastern North America. *Brittonia* 19:1-32.
- Pringle, J. S. 1977. Gentiana linearis (Gentianaceae) in the Southern Appalachians. *Castanea* 42:1-8.
- Radford, A. E., H. E. Ahles, and C. R. Bell. 1965. Atlas of the vascular flora of the Carolinas. *N. C. Agr. Exp. Sta., Tech. Bull.* 165. 208 pp.
- Radford, A. E., H. E. Ahles, and C. R. Bell. 1968. Manual of the vascular flora of the Carolinas. University of North Carolina Press. Chapel Hill. 1183 pp.
- Ramsuer, G. S. 1960. The vascular flora of the high mountain communities of the Southern Appalachians. *J. Elisha Mitchell Sci. Soc.* 76:82-112.
- Reed, M. S. 1936. The genus Cyperus in North Carolina. *J. Elisha Mitchell Sci. Soc.* 52:295-306.
- Robinson, H. 1960. The genus Gerardia in Tennessee. *J. Tenn. Acad. Sci.* 35:9-16.
- Rogers, K. E., and F. D. Bowers. 1969. Notes on Tennessee plants. I. *Castanea* 34:394-397.
- Rogers, K. E., and F. D. Bowers. 1971. Notes on Tennessee plants. II. *Castanea* 36:191-194.
- Rogers, K. E., and F. D. Bowers. 1973. Notes on Tennessee plants. III. *Castanea* 38:335-339.

- Rogers, K. E., and J. K. Underwood. 1966. Some plants new to Tennessee. *Rhodora* 68:518-519.
- Rogers, K. E., and J. K. Underwood. 1968. Some noteworthy Tennessee plants. *Castanea* 33:260-261.
- Russell, N. H. 1965. Violets (Viola) of central and eastern United States: an introductory survey. *Sida* 2:1-113.
- Sargent, C. S. 1933. Manual of the trees of North America. Houghton Mifflin. New York. 934 pp.
- Shanks, R. E. 1941. The genus Juncus in Tennessee. *J. Tenn. Acad. Sci.* 6:345-351.
- Shanks, R. E. 1947. Key to the species of Vaccinium in the Great Smoky Mountains. 1 p. (Typescript).
- Shanks, R. E. 1952a. Checklist of woody plants of Tennessee. *J. Tenn. Acad. Sci.* 27:27-50.
- Shanks, R. E. 1952b. Notes on woody plant distribution in Tennessee. *Castanea* 17:90-96.
- Shanks, R. E. 1953. Great Smoky Mountains National Park Crataegus. 1 p. (Typescript).
- Shanks, R. E. 1954a. Woody plants of Tennessee: second supplement. *J. Tenn. Acad. Sci.* 29:234-237.
- Shanks, R. E. 1954b. Reference lists of native plants of the Great Smoky Mountains. 17 pp. (Typescript).
- Shanks, R. E. 1957. Provisional key to Tennessee species of Rubus. 6 pp. (Typescript).
- Shanks, R. E. 1961. Woody plants of the Great Smoky Mountains. 15 pp. (Typescript).
- Shanks, R. E., and A. J. Sharp. 1947. Summer key to the trees of eastern Tennessee. *J. Tenn. Acad. Sci.* 22:114-133.
- Shanks, R. E., and A. J. Sharp. 1963. Summer key to Tennessee trees. University of Tennessee Press. Knoxville. 24 pp.
- Sharp, A. J. 1931. Trichomanes petersii A. Gray in Tennessee. *Am. Fern. J.* 21:75-76.
- Sharp, A. J. 1934a. Report for August 1934. 4 pp. (Typescript).
- Sharp, A. J. 1934b. Botanical trips taken for the National Park Service, 1934. 1 p. (Typescript).

- Sharp, A. J. 1937. Notes on ferns of the Southern Appalachians. J. Tenn. Acad. Sci. 12:186-187.
- Sharp, A. J. 1941. The Great Smoky Mountains National Park, an important botanical area. Chronica Botanica 13:296-297.
- Sharp, A. J. 1942a. Preliminary checklist of trees in the Great Smoky Mountains National Park. 39 pp. (Typescript).
- Sharp, A. J. 1942b. A preliminary checklist of the woody and semi-woody shrubs and vines occurring in Great Smoky Mountains National Park. 17 pp. (Typescript).
- Sharp, A. J. 1942c. A preliminary checklist of pteridophytes in the Great Smoky Mountains National Park. 17 pp. (Typescript).
- Sharp, A. J. 1955. Preliminary keys to the genera and species of Tennessee ferns. J. Tenn. Acad. Sci. 30:85-89.
- Sharp, A. J. 1957. Vascular epiphytes in the Great Smoky Mountains. Ecology 38:654-655.
- Sharp, A. J. 1975. Key to the identification of spring wildflowers of Great Smoky Mountains National Park. 23 pp. (Typescript).
- Sharp, A. J. n. d. A preliminary and artificial key to the Pilgrimage wildflowers. 23 pp. (Typescript).
- Sharp, A. J., and A. Baker. 1966. First and interesting reports of flowering plants in Tennessee. Castanea 29:178-185.
- Sharp, A. J., R. E. Shanks, H. L. Sherman, and D. H. Norris. 1960. A preliminary checklist of dicots in Tennessee. University of Tennessee, Knoxville. 114 pp. (Typescript).
- Sharp, A. J., R. E. Shanks, J. K. Underwood, and E. McGilliard. 1956. A preliminary checklist of monocots in Tennessee. University of Tennessee, Knoxville. 33 pp. (Typescript).
- Shaver, J. M. 1926. Flowers of the Great Smokies. J. Tenn. Acad. Sci. 1:17-20.
- Shaver, J. M. 1960. Trillium cuneatum Raf. in Tennessee. J. Tenn. Acad. Sci. 35:87-91.
- Showalter, H. M. 1938. The distribution of Tradescantia in the eastern mountain region. J. Tenn. Acad. Sci. 13:253-258.
- Small, P. F., and F. H. Barclay. 1973. New county records of Tennessee orchids. Castanea 38:189-193.
- Stupka, A. 1938. Report on the progress made in a survey of the natural history of the Great Smoky Mountains National Park. J. Tenn. Acad. Sci. 13:60-62.

- Stupka, A. 1964. Trees, shrubs, and woody vines of Great Smoky Mountains National Park. University of Tennessee Press. Knoxville. 186 pp.
- Thomas, R. D. 1976. The vascular flora of Chilhowee Mountain, Blount and Sevier Counties, Tennessee. J. Tenn. Acad. Sci. 51:118-123.
- Thomas, R. D., and E. W. Chester. 1967. Xerophyllum asphodeloides, Mirabilis nyctaginea, and Cardiospermum halicacabum from Tennessee. Castanea 32:183-185.
- Underwood, J. K. 1936. A study of the Cyperaceae of Tennessee. J. Tenn. Acad. Sci. 7:65-119.
- Underwood, J. K. 1945. The genus Carex in Tennessee. Amer. Midl. Nat. 33:613-643.
- Uttal, L. J. 1967. Stoloniferous Canadian violets: Appalachian status and revised nomenclature. Castanea 32:108-110.
- Wagner, W. H., and A. J. Sharp. 1963. A remarkably reduced vascular plant in the United States. Science 142:1483-1484.
- Wells, J. R., and A. J. Sharp. 1966. The Coffeoideae (Rubiaceae) of Tennessee. J. Tenn. Acad. Sci. 41:147-153.
- White, E. 1939. Plants of the Smoky Mountains. Trans. Ill. Acad. Sci. 32:82-85.
- White, P. S. 1981. Looking for Linnaea--rare plant botanizing in the high Smokies. Tennessee Conservationist 46(5):14-16.
- White, P. S. 1982. New and noteworthy plants from Great Smoky Mountains National Park, North Carolina and Tennessee. Castanea 47:78-83.
- White, P. S., and S. P. Bratton. 1980. After preservation: the philosophical and practical problems of change. Biol. Conserv. 18:241-255.
- Whittaker, R. H. 1956. Vegetation of the Great Smoky Mountains. Ecolog. Monogr. 26:1-80.
- Wofford, B. E. 1980. Atlas of the vascular plants of Tennessee. III. Caryophyllidae: Caryophyllales, Polygonales. J. Tenn. Acad. Sci. 55: 110-114.
- Wofford, B. E. and A. M. Evans. 1979a. Atlas of the vascular plants of Tennessee. I. Pteridophytes and gymnosperms. J. Tenn. Acad. Sci. 54: 32-38.
- Wofford, B. E., and A. M. Evans. 1979b. Atlas of the vascular plants of Tennessee. II. Magnoliidae: Aristolochiales, Magnoliales, Nymphaeales, Papaverales, Piperales, Ranunculales. Proc. Tenn. Acad. Sci. 54:75-80.
- Wofford, B. E., and W. M. Dennis. 1976. State records and other recent noteworthy collections of Tennessee plants. Castanea 41:119-121.

Wofford, B. E., D. H. Webb, and W. M. Dennis. 1977. State records and other recent noteworthy collections of Tennessee plants. II. *Castanea* 42: 190-193.

Wofford, B. E., and P. S. White. 1981. Phanerogams of the Southern Appalachians: an indexed bibliography of systematics and identification. USDI, National Park Service, Southeast Region Res./Resour. Manage. Rept. 53. 69 pp.

APPENDICES

	<u>Page</u>
I. Excluded species	178
II. Plants listed by Hoffman, based on collections from outside GRSM	187
III. Species of the Chilhowee Mountain flora, currently unknown in GRSM	190
IV. Towards a five county flora	194
V. A checklist of the woody plants of GRSM	203
VI. A checklist of the exotic plants of GRSM	208
VII. Exotic plants known only from developed areas in GRSM . . .	216

APPENDIX I

EXCLUDED SPECIES

This Appendix lists species that could not be verified as part of the park flora. Cases of straightforward synonymy are not, in general, cited here (see checklist where such synonymy is given). Most of the names on the following list are either misidentified specimens, species for which no specimens could be located, or species which have been collected near but not inside the park. There are also a number of sight records given, many of which were searched for in the field without success. I have not listed every plant which has been at one time or another attributed to the park flora; however, I have included the more interesting cases and species whose absence from the main checklist requires further explanation.

[Appendix I, Excluded Species - continued]

- Acer nigrum* Michx. f. - Specimens attributed to this taxon were seen at Western Carolina University herbarium; although hairy, the material did not match *Acer nigrum* (*Acer saccharum* var. *nigrum* [Michx f.] Small) in all respects and so was not included.
- Acer saccharinum* L. - Not yet collected in GRSM; reported from all around our borders. Also noted in Cosby area (Glenn Cardwell, personal communication) at old homesites. Needs verification.
- Agalinis decemloba* (Greene). Penn. - The specimen on which Hoffman based his record was *A. setacea*.
- Agave virginica* L. - Planted in GRSM during thesis research of Natella (1973); no known persistent individuals.
- Alliaria petiolata* Andrz. - No specimen seen.
- Allium cernuum* Roth. - No specimen seen.
- Alnus rugosa* (Du Roi) Spreng. - Based on mis-identifications of *A. serrulata*.
- Amorpha cynostachya* M.A. Curtis. - Interpreted here to be part of the *A. fruticosa* complex.
- Anemone minima* DC. - the TVA Heritage Program data file cites a specimen from Norton's Creek, Gatlinburg (Braun, unnumbered, at the Smithsonian Institution herbarium). Outside GRSM; specimen not seen.
- Arisaema atrorubens* (Ait.) Blume and *Arisaema quinatum* (Nutt.) Schott - Included within the variable *A. triphyllum* complex.
- Aristida* - Hoffman (1964) listed this genus with the note "Genus reported present, not collected" -- no specimen seen.
- Asclepias obovata* Ell. - No specimen seen.
- Asplenium pinnatifidum* Nutt. - Sharp (1942c) referred to a locale for this species near Tremont; no specimen could be found; the record probably was based on a mix-up of locale.
- Aster concolor* L. - No specimen seen.
- Aster priceae* Britt. - Jennison (1939a) cited a specimen he collected in 1928 on the Rainbow Falls trail; the specimen was subsequently destroyed in the Morrill Hall fire.
- Aster simplex* Willd. - No specimen seen; probably based on specimens of *A. pilosus*.
- Astilbe crenatiloba* (Britt.). - The TVA Heritage Program data file cites three collections of this species in Swain County, near Indian Creek (Ruth 337, 320 at Gray Herbarium; Sharp 5482 at TENN). No specimen could be found at TENN; those at Gray Herbarium are more likely *A. biternata*.
- Aureolaria pedicularia* (L.) Raf. - No unambiguous way could be found to separate specimens of this species from *A. pectinata*; hence, this species has been dropped from the list.

[Appendix I, Excluded Species - continued]

- Blephilia ciliata* (L.) Benth. - No specimen seen; probably based on variation in *B. hirsuta* found in the park.
- Brassica nigra* (L.) W.D.J. Koch. - No specimen seen.
- Bromus racemosus* L. - No specimen seen.
- Broussonetia papyrifera* (L.) Vent. - Shanks and Sharp (1963) cited this species as in GRSM; no specimens or live trees known. An earlier Jennison record of this species was based on a mis-identified specimen of *Morus alba*.
- Buckleya distichophylla* Torr. - Jennison (see Jennison 1939b) planted *Buckleya* in the LeConte area, but it was not refound by Jennison in subsequent searches. No other reports from GRSM.
- Caltha palustris* L. - Reported for the park area by Horace Kephart; no specimen exists.
- Carex conjuncta* Boott. - No specimen seen.
- Carex festucacea* Schkuhr. - No specimen seen.
- Carex gracilescens* Steudel. - Bryson (personal communication) tentatively identified this specimen in the park, but the material was not conclusive.
- Carex longii* MacKenzie. - No specimen seen.
- Carex straminea* Willd. - No specimen seen.
- Carex venusta* Dewey. - Cited by Ramseur (1960) for the park; no specimen seen.
- Carya aquatica* (Michx. f.) Nutt. - Frank Miller (personal communication) reported this taxon from Cades Cove; a search of the area revealed only other *Carya* species.
- Carya laciniosa* (Michx. f.) Loud. - Outside GRSM (Stupka 1964).
- Catalpa bignonioides* Watt. - Cited by Shanks (1961); no specimens seen.
- Chelone chlorantha* Penn. & Wherry. - All specimens determined here are better referred to the variable *C. glabra* complex.
- Chenopodium boscianum* Moq. - Listed by Sharp et al. (1960) for GRSM; no specimens seen.
- Cirsium carolinianum* (Walt.) Fern. & Schub. - Specimens labelled this species at TENN and GRSM were ambiguous and referred to *C. altissimum*.
- Collinsonia verticillata* Baldwin ex Mill. - No specimens seen.
- Conium maculatum* L. - No specimens seen.
- Coralorhiza maculata* Raf. - Reports of this taxon in the park come from a variety of sources (Pepoon, Barksdale 1936), but no specimen exists to verify its presence.
- Coreopsis latifolia* Michx. - No specimen seen.

[Appendix I, Excluded Species - continued]

- Cornus canadensis* L. - Karl Steinmetz of Knoxville claimed to have seen this species at the junction of Lynn Camp Prong and Thunderhead Prong in 1920, but Jennison (1939b) could not find it there.
- Cosmos bipinnatus* Car. - Known from cultivated plants, probably does not persist.
- Cosmos caudatus* HBK. - Known from cultivated plants, probably does not persist.
- Crataegus intricata* Lange. - Outside GRSM (Stupka 1964).
- Crataegus regalis* Beadle. - Interpreted here within the variation of *C. crus-galli*.
- Cypripedium reginae* Walt. - Several amateur botanists reported this plant from Cades Cove several years ago, but felt it had been gathered by poachers. Orchid specialists doubt the validity of the record.
- Desmodium canadense* (L.) DC. - Included here in *D. paniculatum*.
- Desmodium canescens* (L.) DC. - Specimens determined here were *D. paniculatum*.
- Desmodium sessilifolium* (Torr.) T. & G. - Specimens labelled this species were *D. paniculatum*.
- Digitaria violascens* Link. - Not separable from *D. ischaemum* based on material at GRSM and TENN.
- Dioscorea quaternata* Walt. ex. Gmel. - Included here within *D. villosa*.
- Dirca palustris* L. - Frank Miller (personal communication) stated that he had seen this plant in Swain County (letter of 12/8/76).
- Dryopteris spinulosa* var. *fruticosa* (Gilbert) Trudell. - No specimen could be found.
- Eleagnus angustifolia* L. - No specimen seen.
- Eleocharis engelmannii* Steud. - Sharp et al. (1960) attributed this species to GRSM; no specimen seen.
- Elymus canadensis* L. - Determination changed to *E. riparius*.
- Elymus interruptus* Buckl. - Determination changed to *E. riparius*.
- Euphorbia mercurialiana* Michx. - No specimen seen.
- Festuca arundinacea* Schreb. - Included here in *F. elatior*.
- Fothergilla major* Lodd. - Outside GRSM (Stupka 1964) near Norton's Creek, Gatlinburg.
- Fraxinus quadrangulata* Michx. - Attributed by Sargent (1933) to the Great Smoky Mountains, it has never been documented in the area.
- Galactia volubilis* (L.) Britt. - Although listed by Hoffman (1964) no specimens could be found.

[Appendix I, Excluded Species - continued]

Gentiana puberula Michx. - Ramseur (1960) cited this species in park flora; based on specimens of *G. decora*.

Glyceria grandis S. Wats. - The TVA Heritage Program data file cites a specimen of this species at the Gray Herbarium (Jennison and Anderson, unnumbered, state-line ridge, Sevier Co.); this specimen turns out to be *G. nubigena*.

Habenaria blephariglottis (Willd.) Hook. - Collected outside the park in Haywood Co. (Correll (1937)). (*Platanthera blephanglottis* [Wild.] Lindl.)

Habenaria flava (L.) R. Br. - Collected outside the park in Haywood (Correll 1937) and Cocke Counties (specimen at Vanderbilt; Tom Patrick, personal communication). (*Platanthera flava* [L.] Lindl.)

Habenaria orbiculata (Pursh) Torr. - Attributed to the Greenbrier area by R. Becking, ca. 1977; no specimen seen, no exact locale data known. (*Platanthera orbiculata* [Pursh] Lindl.)

Helianthus hirsutus Raf. - Specimens formerly placed here were *H. divaricatus*.

Helianthus laetiflorus Pers. - Specimens formerly placed here were *H. decapetalus*.

Helianthus strumosus L. - Specimens formerly placed here were *H. decapetalus*.

Hesperis matronalis L. - No specimens seen.

Hieracium canadense Michx. - No specimens seen.

Hieracium marianum Willd. - Specimens labelled this taxon turned out to be *H. florentinum*.

Houstonia pusilla Schoepf. - Reported in a note in Stupka's files; no specimen seen.

Hydrastis canadensis L. - Never collected within the park itself.

Hymenocallis occidentalis (Leconte) Kunth. - Sterile specimens were (see discussion of Sharp and Stupka's work above) seen in Abrams Creek Gorge; no specimen extant to verify the species in our flora.

Hypericum denticulatum HBK. - Specimens at GRSM and TENN were collected outside the park ("Howell's Mill Bog," n.e. of Waynesville; this is also the site for *Lysimachia terrestris*)

Impatiens oliveri Wright. - Collected from cultivated plants; does not persist.

Isotria medeoloides (Pursh) Raf. - An amateur botanist has claimed that this plant occurs in the area; no populations documented.

Jeffersonia diphylla (L.) Pers. - Cultivated by wildflower gardeners; no native populations are known.

Juncus dichotomus Ell. - Redetermined to *J. interior*.

[Appendix I, Excluded Species - continued]

- Juncus dudleyi* Wieg. - Redetermined to *J. interior*.
- Juncus polycephalus* Michx. - Redetermined to *J. canadensis*.
- Lagerstroemia indica* L. - Developed areas only (see Appendix VII).
- Leersia hexandra* Swartz. - Hoffman's report was based on a young specimen of *L. virginica*.
- Lilium michiganense* Farw. - Pittillo and Govus (1978) related a report of this taxon in the Raven Fork area.
- Luzula bulbosa* (Wood.) Rydb. - No specimens extant which could not more easily be placed in other species.
- Luzula campestre* (L.) DC. - No specimens seen.
- Lycium halimifolia* Mill. - Shanks (1961) listed this species for the Park; no specimens seen.
- Lycopus rubellus* Moench. - Specimens determined here turned out to be other *Lycopus* species.
- Lycoris squamigera* Maxim. - Formerly in cultivation, not known to persist.
- Lysimachia terrestris* (L.) BSP - Specimens were collected outside GRSM ("Howell's Mill Bog," n.e. of Waynesville).
- Malus coronaria* (L.) Mill. - No specimens seen.
- Melia azedarach* L. - No specimens collected from within GRSM.
- Muhlenbergia sobolifera* var. *setigera* Scribn. - Collected just outside GRSM.
- Nicotiana tabacum* L. - Formerly in cultivation; not known to persist.
- Nyssa aquatica* L. - Hoffman's (1966b) report was based on a sterile specimen; probably in error.
- Oenothera pilosella* Raf. - No specimens seen.
- Opuntia compressa* (Salisb.) Macbride. - In dry pastures and rocky woods around the park, but not yet collected within our boundaries.
- Orontium aquaticum* L. - Reported for the park area by Horace Kephart; no specimens exist.
- Pachysandra procumbens* Michx. - Occurs outside GRSM in Blount Co.; a sight record from White Oak Sink has not yet been verified.
- Penstemon brevisepalus* Penn. - Specimens of this taxon could not be separated from *P. canescens*.
- Penstemon hirsutus* (L.) Willd. - No specimens seen.
- Petunia axillaris* (Lam.) BSP. - Formerly in cultivation; does not persist.
- Petunia violacea* Lindl. - Formerly in cultivation; does not persist.

- Philadelphus pubescens* Loisel. - Outside GRSM.
- Phalaris canariensis* L. - No specimens seen.
- Picea mariana* (P. Mill.) B.S.P. - Erroneously attributed to GRSM by Gaylon (1928a) and Pepoon.
- Picea pungens* Marst. - Collections from cultivated trees at Twin Creeks were *Abies concolor*.
- Plantago major* L. - All specimens seen were *P. rugelii*, including those of Ramseur (1960) at the University of North Carolina.
- Polygala incarnata* L. - No specimens seen.
- Polygala nuttallii* T & G. - No specimens seen.
- Polygonum arifolium* L. - No specimens seen.
- Populus grandidentata* Michx. - Erroneously reported; based on specimens of *P. canescens* and other cultivars.
- Psoralea onobrychis* Nutt. - TVA Heritage Program data file cites a specimen near Wayesville (Hall 502 at Smithsonian Institution); outside GRSM.
- Pteretis pensylvanica* (Willd.) Fern. - Cultivated near Pigeon Forge; brought to Wildflower Pilgrimage Wildflower display in 1981.
- Pycnanthemum beadleii* (Small) Fern. - Included in *P. incanum*.
- Pycnanthemum flexuosum* (Walt.) BSP. - All collections were redetermined as *P. tenuifolium*.
- Pycnanthemum pycnanthemoides* Fern. - Included in *P. incanum*.
- Pyrola americana* Sweet. - Erroneously reported by Jennison (1937); based on a specimen of *Gaultheria procumbens*.
- Quercus bicolor* Willd. - This taxon was based on specimens of *Q. muhlenbergii*; it has been a persistent confusion in our flora (see Stupka 1964).
- Ranunculus ambigens* S. Wats. - Sharp et al. 1960 attributed this species to the park; no specimen seen.
- Raphanus raphanistrum* L. - No specimen seen.
- Rhododendron canescens* (Michx.) Sweet. - Specimens determined here have been included in *R. nudiflorum*.
- Rhus aromatica* Ait. - Outside GRSM.
- Rhynchospora perplexa* Britt. - Sharp et al. (1960) attributed this species to the Park; no specimen seen.
- Ribes lacustre* (Pers.) Poir. - Noted by Jennison (1937a) and in letters of Hoffman; based on other *Ribes* species.
- Ricinus communis* L. - Formerly in cultivation, does not persist.
- Rubus pauciflorus* Bailey. - Presumed to be a depauperate (shaded) form of other species (see Davis et al. 1969).

[Appendix I, Excluded Species - continued]

Rumex patientia L. - All specimens were *R. crispus*.

Salix discolor Muhl. - No valid specimens; redetermined to other *Salix* species.

Saxifraga caroliniana Gray. - The TVA Heritage Program data file cites a specimen of this taxon from Leconte Creek (Braun, unnumbered, at Gray Herbarium); based on *S. careyana*.

Saxifraga virginiana Michx. - No specimens seen from inside GRSM.

Scutellaria parvula Michx. - No specimens seen.

Scutellaria pilosa Michx. - No specimens seen.

Senecio pauperculus Michx. - No specimens seen.

Senecio vulgaris L. - No specimens seen.

Shortia galacifolia T. & G. - Collected outside the park in Swain County; the specimens may have been from cultivated plants (Jim Massey, personal communication).

Silphium integrifolium Michx. - Specimens determined here are better placed in other *Silphium* species.

Silphium terebinthinaceum Jacq. - No specimen from GRSM.

Solanum dulcamara L. - Shanks (1961) listed this species for the park; no specimen seen.

Solanum nigrum L. - Formerly confused with *S. ptycanthum* Dun.

Solidago juncea Ait. - Specimens formerly placed here were found to be *S. arguta*.

Solidago squarrosa Muhl. - No specimens seen.

Spiranthes beckii Lindl. - Redetermined to *S. grayii*.

Stachys palustris L. - Redetermined to other *Stachys* species.

Stachys salvioides Small. - Redetermined to *Stachys riddellii*.

Stachys tenuifolia Willd. - Redetermined to *Stachys latidens*.

Stylophorum diphyllum (Michx.) Nutt. - Verbal records of this plant as formerly found near old homesites in the Greenbrier area could not be verified.

Stylosanthes riparia Kearney. - Specimen redetermined to *S. biflora*.

Tanacetum vulgare L. - No specimens could be found to verify Hoffman's listing of this species; Glenn Cardwell (personal communication) states it was formerly grown in Greenbrier area.

Thermopsis caroliniana M.S. Curtis - Specimens redetermined to *T. villosa*.

Tradescantia virginiana L. - No specimens seen.

[Appendix I, Excluded Species - continued]

- Tragopogon porrifolius* L. - No specimens seen.
- Trichomanes boschianum* Sturm. - Collected outside GRSM.
- Trillium flexipes* Raf. - Attributed to the park by Sharp et al. 1960; no specimen seen.
- Trillium pusillum* Michx. var. *pusillum*. - One specimen from an unmappable locale in Haywood County.
- Tsuga caroliniana* Engelm. - No records from GRSM; cultivated in Gatlinburg.
- Urtica dioica* L. - Reported tentatively by Baron et al. (1975); no specimens seen.
- Vaccinium alto-montanum* Ashe. - Included in *V. constablaei*.
- Vaccinium atrococcum* (Gray) Porter. - No valid specimens seen; specimens labelled here included in *V. constablaei*.
- Vaccinium corymbosum* L. - No valid specimens seen; specimens labelled here included in *V. constablaei*.
- Vaccinium lamarkii* Camp. - Included in *V. angustifolium* here.
- Vaccinium microcarpon* Ait. - No specimens from or locations in GRSM.
- Valerianella locusta* Bectke. - Roadsides, near GRSM.
- Valerianella umbilicata* (Sulliv.) Wood. - Roadsides, near GRSM.
- Vernonia glauca* (L.) Willd. - No specimens seen.
- Viburnum recognitum* Fern. - All specimens redetermined to *V. dentatum*.
- Vicia sativa* L. - No specimens seen.
- Viola affinis* LeConte. - Specimens determined here included in the *V. papilionacea* - *sororia* - *cucullata* complex.
- Viola renifolia* Gray. - Jennison (1935) discussed the erroneous report by Gattinger (1901).
- Viola septentrionalis* Greene. - Specimens determined here included in *V. papilionacea* - *sororia* - *cucullata* complex.
- Viola walteri* House. - Specimens determined as this taxon were determined to be young plants of *V. conspersa*.
- Vitis baileyana* Munson. - Included in *V. vulpina*.
- Wisteria macrostachya* Nutt. - Not deemed distinct from *W. fruticosa*.
- Xanthium chinense* Miller. - Specimens of this plant were collected outside GRSM.
- Yucca filamentosa* L. - All specimens were more straightforwardly placed in *Y. smalliana*.
- Zea mays* L. - Formerly cultivated, not known to persist.
- Zigadenus glaberrimus* Michx. - No specimen seen; erroneously attributed to the park by Jennison (1939b).
- Zizia aurea* (L.) W.D.J. Koch. - Specimens determined here were either outside GRSM or mis-identified (several were *Thaspium trifoliatum*).

APPENDIX II

SPECIES LISTED BY HOFFMAN (1964, 1966b)
BASED ON SPECIMENS COLLECTED OUTSIDE GRSM

In most cases, Hoffman noted that the plants were outside the park; in other cases (indicated below) he did not. Species in parentheses have been recently found within GRSM.

[Appendix II, Status of Certain Hoffman Plants - continued]

Acer saccharinum L.

(*Amelanchier sanguinea* [Pursh] DC.)

Anchusa azurea Mill.

(*Arabidopsis thaliana* [L.] Heynh. - Former collections were outside GRSM, although this was not noted by Hoffman.)

(*Bromus secalinus* L. - Specimen unmappable, may be inside GRSM.)

(*Cardamine parviflora* var. *arenicola* [Britt.] O. E. Schultz.)

(*Carex blanda* Dew.)

Carya laciniosa (Michx.) Loud.

Crataegus intricata Lange. - Outside GRSM, although this was not noted by Hoffman.

(*Crataegus pinetorum* Beadle. - Former collections were outside GRSM, although this was not noted by Hoffman.)

Datura stramonium var. *tatula* (L.) Torr.

(*Eryngium yuccifolium* Michx.)

Galinsoga parviflora Caf.

Gonobolus obliquus (Jacq.) Schultes.

(*Habenaria lacera* Michx.)

Helianthus hirsutus Raf.

Hypericum denticulatum var. *reconitum* Fern. & Schub. - Outside GRSM, although this was not noted by Hoffman.

Juncus scirpoides Lam.

Lysimachia terrestris (L.) BSP. - Outside GRSM, although this was not noted by Hoffman

(*Magnolia grandiflora* L.)

(*Magnolia macrophylla* Michx.)

Muhlenbergia sobolifera var. *setigera* Scribn. - Outside GRSM, although this was not noted by Hoffman.

(*Ornithogalum umbellatum* L.)

(*Panicum virgatum* var. *cubense* Griseb.)

(*Parietaria pensylvanica* Muhl.)

Philadelphus pubescens Loisel. - Outside GRSM, although this was not noted by Hoffman.

(*Phyllanthus carolinianus* Walt.)

Polypodium polypoides f. *incisum* (Gray) Gilbert.

Rhus aromatica Ait.

(*Salix caroliniana* Michx. - Former collections were outside GRSM, although this was not noted by Hoffman.)

[Appendix II, Status of Certain Hoffman Plants - continued]

(*Setaria glauca* [L.] Beav. - Former collections were outside GRSM, although this was not noted by Hoffman.)

(*Sisyrinchium mucronatum* Michx. - Former collections were outside GRSM, although this was not noted by Hoffman.)

(*Smilax hugeri* Small.)

(*Trillium erectum* var. *blandum* Jennison. - Some stations were inside GRSM.)

Xanthium chinense Mill. & Sherff. - Outside GRSM, although this was not noted by Hoffman.

APPENDIX III

THE CHILHOWEE FLORA

Species reported by Thomas (1976) from Chilhowee Mountain (Blount and Sevier Counties, Tennessee), but not currently known in GRSM. See Thomas (1976) for the complete list of the 953 species found in the Chilhowee Mountain flora.

[Appendix III, Chilhowee Flora - continued]

Acer saccharinum L.
Aesculus glabra Willd.
Agalinis decemloba (Greene) Pennell
Agrostis altissima (Walt.) Tuckerm.
Ambrosia bidentata Michx.
Ampelamus albidus (Nutt.) Britt.
Andropogon elliottii Chapm.
Antennaria falax Greene
Arenaria patula Michx.
Aristida dichotoma Michx.
Aristida purpurascens Poir.
Arthraxon hispidus var. *cryptatherus* (Hackel) Honda
Aster concolor L.
Aster laevis L.
Aster prenanthoides Muhl. ex Wild.
Aureolaria patula (Chapm.) Pennell
Aureolaria pedicularia (L.) Raf.
Bidens comosa (Gray) Wieg.
Bidens polylepis Blake
Cirsium carolinianum (Walt.) Fern & Schub.
Coix lacryma-jobi L.
Collinsonia verticillata Baldwin ex Ell.
Commelina erecta L.
Crotalaria sagittalis L.
Croton glandulosus var. *septentrionalis* Muell.-Arg.
Cyperus lancastriensis Porter
Desmodium canescens (L.) DC
Desmodium obtusum (Muhl. ex. Willd.) DC
Desmodium ochroleucum M.A. Curtis
Digitaria filiformis (L.) Koeler
Echinochloa muricata (Michx.) Fern.
Eragrostis capillaris (L.) R. Brown
Erysimum perofskianum Fisch. & Mey.

[Appendix III, Chilhowee Flora - continued]

Eupatorium incarnatum Walter
Euphorbia commutata Engelm.
Euphorbia dentata Michx.
Euphorbia mercurialina Michx.
Festuca myuros L.
Galactia regularis (L.) BSP
Galactia volubilis (L.) Britt.
Helianthemum propinquum Bicknell.
Helianthus hirsutus Raf.
Helianthus maximiliana Schrader
Helianthus silphioides Nutt.
Helianthus strumosus L.
Helianthus tuberosus L.
Hordeum vulgare L.
Hypericum boreale (Britt.) Bickn.
Ipomoea quamoclit L.
Lactuca saligna L.
Leptochloa filiformis (Lam.) Beauvois
Lespedeza nuttallii Darl.
Lespedeza stuevei Nuttall
Lespedeza thunbergii (DC) Nakai
Liatris earlei (Greene) K. Schumann
Linum intercussum (Bicknell) Small
Luzula bulbosa (Wood.) Rydb.
Luzula campestre (L.) DC
Lycopus rubellus Moench.
Melica mutica Walter
Muhlenbergia capillaris (Lam.) Trinius
Panicum flexile (Gattinger) Scribner
Panicum gattingeri Nash
Panicum linearifolium Scribner
Philadelphus pubescens Loisel
Phlox pilosa L.

[Appendix III, Chilhowee Flora - continued]

Physalis heterophylla Nees
Pinus taeda L.
Ptelea trifoliata L.
Pycnanthemum viridifolium (Fern.) Grant & Epl.
Rhynchospora glomerata (L.) Vahl.
Robinia nana Ell.
Sagittaria engelmanniana var. *longirostrata* (Micheli) Bogin
Saururus cernuus L.
Sicyos angulatus L.
Silphium terebinthinaceum Jacquin
Smilax pulverulenta Michx.
Sporobolus vatiniflorus (Torr.) Wood
Strophostyles helvola (L.) Ell.
Thlaspi arvense L.
Tradescantia virginiana L.
Urtica procera Muhl.
Verbena simplex Lehmann
Viola septentrionalis Greene
Xanthium chinense Miller
Xerophyllum asphodeloides (L.) Nuttall

APPENDIX IV

TOWARD A FIVE-COUNTY FLORA

Species found outside GRSM, but within the five counties which include the park, are listed here. The five counties are abbreviated as follows:

B - Blount County, TN

C - Cocke County, TN

S - Sevier County, TN

H - Haywood County, NC

Sw - Swain County, NC

Plants listed by Thomas (1976; see also Appendix III) for Chilhowee Mountain (Blount and Sevier Counties, TN) are not referred to counties but simply to "Chilhowee." The most common reference sources for this list are abbreviated as well:

R - North Carolina county atlas records (Radford et al. 1965; Radford et al. 1968)

T - Chilhowee Mountain records (Thomas 1976)

Other references are given in full and will be found in the literature cited section of this report.

[Appendix IV - Toward a Five-County Flora - continued]

- Acer saccharinum* L. - H (R), B (Hoffman 1964), Chilhowee (T) (see also Stupka 1964).
- Aesculus glabra* Willd. - Chilhowee (T)
- Agalinis decemloba* (Greene) Penn. - Chilhowee (T)
- Agrostis altissima* (Walt.) Tuckerm. - Chilhowee (T)
- Alathaea rosea* (L.) Cav. - H (R)
- Allium cernuum* Roth Roemer - H (R)
- Ambrosia bidentata* Michx. - Chilhowee (T)
- Ampelasmus albidus* (Nutt.) Britt. - Chilhowee (T)
- Anchusa azurea* Mill. - (Hoffman 1964)
- Andropogon elliotii* Chapm. - Chilhowee (T)
- Anemone riparia* Fern. - B (specimen at TENN)
- Angelica atropurpurea* L. - H (R)
- Antennaria falax* Greene - Chilhowee (T)
- Arabis patens* Sullivant - Sw (Pittillo et al. 1972)
- Arenaria patula* Michx. - Chilhowee (T)
- Aristida dichotoma* Michx. - H (R), Chilhowee (T)
- Aristida purpurascens* Poir. - Chilhowee (T)
- Arthraxon hispidus* var. *cryptatherus* (Hackel) Honda - Chilhowee (T)
- Asplenium ebenoides* R.R. Schott - C (Wofford and Evans 1979a)
- Aster concolor* L. - Chilhowee (T)
- Aster laevis* L. - Chilhowee (T)
- Aster novae-angliae* L. - (R)
- Aster prenanthoides* Muhl. ex. Willd. - Sw (R), Chilhowee (T)
- Aster solidagineus* Michx. - Sw (R)
- Aureolaria patula* (Chapm.) Penn. - Chilhowee (T)
- Aureolaria pedicularia* (L.) Raf. - Sw (R), Chilhowee (T)
- Berberis canadensis* Miller - H (R)
- Bidens aritosa* (michx.) Britt - B (PSW)
- Bidens comosa* (Gray) Wieg. - Chilhowee (T)
- Bidens polylepsis* Blake - Sw (R), Chilhowee (T)
- Bidens tripartita* L. - H (R)
- Bidens vulgata* Greene - H (R)
- Buckleya distichophylla* (Nutt.) Torr. - H (R), C (TENN)

[Appendix IV - Toward a Five-County Flora - continued]

- Calamagrostis canadensis* (Michx.) Beauv. - H (R)
Carex abscondita Mackenzie - H (R)
Carex complanata Torr. & Hooker - H (R)
Carex conjuncta Boott - S (Underwood 1945)
Carex crebriflora Wieg. - SW (R)
Carex decomposita Muhl. - C (Underwood 1945)
Carex festucacea Sch. Kuhr. - H, Sw (R)
Carex flaccosperma Dewey - H (R)
Carex howei Mackenzie - Sw (R)
Carex stricta Lam. - H (R)
Carum carvi L. - H (R)
Carya carolinae-septentrionalis (Ashe) Engler & Graebner - B (TENN)
Carya laciniosa (Michx.) Loud. - S (Hoffman 1964)
Centaurea maculosa Lam. - H (R)
Chaerophyllum procumbens (L.) Crantz - B (specimen at GRSM)
Chielanthes alabamense (Buckley) Kuntze - B (Wofford and Evans 1979a)
Cirsium carolinianum (Walt.) Fern. & Schub. - Chilhowee (T)
Coix lacryma-jobi L. - Chilhowee (T)
Collinsonia verticillata Baldwin ex. Ell. - Chilhowee (T)
Comandra umbellata (L.) Nutt. - H (R)
Commelina erecta L. - Chilhowee (T)
Comptonia peregrina (L.) Coulter - H (R)
Conium maculatum L. - H (R)
Consolida ambigua (L.) P. W. Ball & Hayw. - B (Wofford & Evans 1979b)
Coralorhiza maculata Raf. - H, Sw (Correll 1937)
Coreopsis lanceolata L. - Sw (Pittillo et al. 1969)
Corydalis flavula (Raf.) DC - Sw (R), C (Wofford & Evans 1979b)
Corydalis micrantha ssp. *australis* (Dewey) Chapm. - Sw (R)
Crataegus flabellata (Bosch) K Koch - H, Sw (R)
Crataegus intricata Lange - B (Hoffman 1964; see also Stupka 1964)
Crataegus punctata Jacq. - H (R)
Crataegus uniflora Muenchh. - Sw (R)
Crotalaria sagittalis L. - Chilhowee (T)

[Appendix IV - Toward a Five-County Flora - continued]

- Croton glandulosus* var. *septentrionalis* Muell.-Art. - Chilhowee (T)
Cucurbita pepo L. - H (R)
Cyperus esculentus L. - H, Sw (R), B (TENN)
Cyperus filiculmis Vahl. - H (R)
Cyperus lancastrensis Porter - Chilhowee (T)
Cyperus ovularis (Michx.) Torr. - B (Hoffman 1964)
Cyperus refractus Engelm. ex Boeckler - Sw (R)
Delphinium exaltatum Ait. - H (R)
Deschampsia flexuosa (L.) Trin. - H (R)
Desmodium canescens (L.) DC - Chilhowee (T), H, Sw (R)
Desmodium glabellum (Michx.) DC - H, Sw (R)
Desmodium obtusum (Muhl. ex Willd.) DC - Chilhowee (T)
Desmodium ochroleucum MA Curtis - Chilhowee (T)
Desmodium perplexum Schubert - Sw (R)
Diervilla lonicera Miller - H (R)
Digitaria filiformis (L.) Koeler - H (R), Chilhowee (T)
Dirca palustris L. - B (TENN)
Dryopteris cristata (L.) Gray - H (R)
Echinochloa muricata (Beauv.) Fern. - Chilhowee (T)
Eleocharis quadrangulata (Michx.) R & S - Sw (R)
Elymus canadensis L. - Sw (R)
Equisetum hyemale var. *affine* (Engelm.) AA Eaton - H (R; Pittillo et al. 1975);
 B (Wofford and Evans 1979a)
Eragrostis capillaris (L.) Nees - (R); Chilhowee (T)
Eragrostis cilianensis (Ait.) Lutati - H, Sw (R)
Eragrostis pilosa (L.) - Beauv. - H (R)
Erjophorum virginicum L. - Herb records NC bogs
Eryngium integrifolium Walter - Sw (R)
Erysimum perofskianum Fisch. & Mey. - Chilhowee (T)
Eupatorium incarnatum Walter - Chilhowee (T)
Euphorbia commutata Engelm. - Chilhowee (T)
Euphorbia cyparissias L. - H (R); B (PSW)
Euphorbia dentata Michx. - H (R); Chilhowee (T)

[Appendix IV - Toward a Five-County Flora - continued]

- Euphorbia mercurialina* Michx. - Chilhowee (T)
Festuca myuros L. - Chilhowee (T)
Fimbristylis puberula (Michx.) Vahl. - B (Committee for Tennessee Rare Plants 1978)
Fothergilla major Lodd - S (Hoffman 1964; specimens at TENN, GRSM; see also Stupka 1964)
Fraxinus tomentosa Michx. f. - Sw (R)
Galactia regularis (L.) BSP - Chilhowee (T)
Galactia volubilis (L.) Britt. - Chilhowee (T); Sw (R)
Galinsoga pariflora Cav. - (Hoffman 1964)
Galium asprellum Michx. - H (R)
Gentiana clausa Raf. - H (R) (Pringle 1967)
Geranium pusillum Burman f. - H (R)
Gonebolus obliquus (Jacq.) Schultes - (Hoffman 1964)
Habenaria blephariglottis (Willd.) Hook - H (Correll 1937)
Habenaria flava (L.) R. Brown - H (TENN; Correll 1937)
Helenium flexuosum Raf. - H (R)
Helianthemum canadense (L.) Michx. - B, S (Committee for Tennessee Rare Plants 1978)
Helianthemum propinquum Bicknell - Chilhowee (T); B (Committee for Tennessee Rare Plants 1978)
Helianthus giganteus L. - H (R)
Helianthus hirsutus Raf. - H, Sw (R); (Hoffman 1966b); Chilhowee (T)
Helianthus maximiliana Schrader - Chilhowee (T); (Beatley 1963)
Helianthus silphioides Nutt. - Chilhowee (T)
Helianthus strumosus L. - Chilhowee (T)
Helianthus tuberosus L. - Chilhowee (T)
Hexastylis heterophylla (Ashe) Small - C (Wofford and Evans 1979b)
Holosteum umbellatum L. - B (Wofford 1980)
Hordeum vulgare L. - Chilhowee (T)
Hypercam boreale (Britt.) Buckn. - Chilhowee (T)
Hypericum buckleyi MA Curtis - H (R)
Hypericum denticulatum var. *acutifolium* (Ell.) Blake - H (R)
Hypericum denticulatum var. *recognitum* Fern. & Schub. - Specimen attributed to GRSM is outside the Park (TENN).

[Appendix IV - Toward a Five-County Flora - continued]

- Inula helenium* L. - H (R)
Iponoea quamoclit L. - Chilhowee (T)
Juncus scirpoides Lam. - outside GRSM (Hoffman 1964)
Juncus subcaudatus (Engelm.) Coville & Blake - Sw (R)
Lactuca hirsuta Muhl. - H (R)
Lactuca saligna L. - Chilhowee (T)
Leptochloa filiformis (Lam.) Beauv. - Chilhowee (T)
Lespedeza nuttallii Darl. - H, Sw (R); Chilhowee (T)
Lespedeza steuvei Nutt. - Chilhowee (T)
Lespedeza thunbergii Nakai - Chilhowee, (T)
Liatris earlei (Greene) K. Schumann - Chilhowee (T)
Linum intercussum (Bicknell) Small - Chilhowee (T)
Lonicera dioica L. - Sw (Pittillo et al. 1972)
Luzula bulbosa (Wood.) Rydb. - Chilhowee (T)
Luzula compestre (L.) DC - Chilhowee (T); Sw, H (R)
Lycopns rubellus Moench - Chilhowee (T)
Lysimachia terrestris (L.) BSP - H, (R; TENN)
Malus coronaria (L.) Miller - H (R), Sw (Pittillo et al. 1969)
Marrubium vulgare L. - H (R)
Medicago sativa L. - H (R)
Melica mutica Walter - H (R); Chilhowee (T)
Mentha rotundifolia (L.) Hudson - H (R)
Muhlenbergia capillaris (Lam.) Trin. - Chilhowee (T)
Muhlenbergia sobolifera var. *setigera* Scribn. - B (Rogers and Underwood 1966)
Opuntia compressa (Salisbury) MacBride - B (TENN; Wofford 1980)
Oxalis florida Salisbury - H, Sw (R)
Pachysandra procumbens Michx. - B (TENN)
Panicum capillare L. - H (R)
Pancium flexile (Gattinger) Schrib. - Chilhowee (T)
Panicum gattingeri Nash - H (R), Chilhowee (T)
Pancium linearifolium Scribn. - Chilhowee (TK)
Papaver dubium L. - Sw (R), B (Wofford and Evans 1979b)
Papaver hybridum L. - Sw (R)

[Appendix IV - Toward a Five-County Flora - continued]

- Parnassia grandiflora* DC - H (R)
Paronychia argyrocoma (Michx.) Nutt. - H (specimen at GRSM)
Pedicularis lanceolata Michx. - H (R)
Pellaea glabella Nett. - B (Wofford and Evans 1979a)
Penstemon calycosus Small - H (R)
Phalaris arundinacea L. - H (R)
Philadelphus pubescens Loisel. - Chilhowee (T)
Phlox pilosa L. - Chilhowee (T)
Physalis heterophylla Nees - H (R), Chilhowee (T)
Pinus taeda L. - B, S (Wofford and Evans 1979a), Chilhowee (T)
Plantago major L. - H (R)
Polygonum coccineum Muhl. - B (Wofford 1980)
Polygonum hydropiper L. - H, Sw (R), B (Wofford 1980)
Polygonum tenue Michx. - H (Pittillo et al. 1972)
Polypodium polypoides f. *incisum* (Gray) Gilbert - Outside GRSM (Hoffman 1964)
Populus grandidentata Michx. - H (R), S (Committee for Tennessee Rare Plants 1978)
Potamogeton epihydrus Raf. - H (R), B (Committee for Tennessee Rare Plants 1978)
Potamogeton nodosus Poir. - H (R)
Potamogeton pulcher Tuckerm. - H (R)
Potentilla argentea L. - S (Rogers and Bowers 1969), Sw (R)
Potentilla tridentata Ait. - H (R)
Psoralea onobrychis Nutt. - H (R)
Ptelea trifoliata L. - Chilhowee (T)
Pycnanthemum viridiflorum Fern. - Chilhowee (T)
Quercus nigra L. - Sw (Pittillo et al. 1969)
Ranunculus harveyi (Gray) Britt. - S (Wofford and Evans 1979b)
Rhododendron vaseyi Gray - H (Cooper et al. 1977)
Rhus aromatica Ait. - Sw (Hoffman 1964; see also Stupka 1964)
Rhynchospora glomerata (L.) Vahl - Chilhowee (T)
Robinia nana Ell. - Chilhowee (T)
Robinia viscosa Vent. - H (R)

[Appendix IV - Toward a Five-County Flora - continued]

- Sagittaria engelmanniana* var. *longirostrata* (Micheli) Bogin - Chilhowee (T)
Salvia urtifolia L. - H (R)
Saururus cernuus L. - Chilhowee (T)
Saxifraga caroliniana Gray - H (Cooper et al. 1977)
Scirpus expansus Fern. - H, Sw (R)
Scirpus purshianus Fern. - H, Sw (R)
Scutellaria serrata Andr. - Sw (R)
Selaginella rupestris (L.) Spring - H (R); C (Wofford and Evans 1979a)
Shortia galacifolia T. & G. - Sw (Cooper et al. 1977)
Sicyos angulatus L. - Chilhowee (T)
Silene dichotoma Ehrhart - H (Pittillo et al. 1972)
Silphium terebinthinaceum Jacq. - Chilhowee (T)
Smilax pulverulenta Michx. - H (R); Chilhowee (T)
Solidago rigida L. - H (R)
Solidago uliginosa Nutt. - H (Cooper et al. 1977)
Sphenopholis intermedia (Rydb) Rydb - H (R)
Sporobolus vaginiflorus (Torr.) Wood - Chilhowee (T)
Stellaria alsine Grimm - C (Committee for Tennessee Rare Plants 1978; Wofford 1980).
Stipa avenacea L. - H (R)
Strophostyles helvola (L.) Ell. - Chilhowee (T)
Stylophorum diphyllum (Michx.) Nutt - B (Wofford and Evans 1979b)
Tanacetum vulgare L. - H (R)
Thlaspi arvense L. - H (R), Chilhowee (T)
Tradescantia virginiana L. - Chilhowee (T)
Tragopogon purrifolius L. - H (R)
Trichomanes boschianum Sturm ex Busch - B (Wofford and Evans 1979a)
Trifolium arvense L. - H (R)
Trillium pusillum Michx. var. *pusillum* - H (NC Heritage Program data file)
Triosteum perfoliatum L. - H (R)
Tsuga caroliniana Englm. - H, Sw (R); S (prob. introduced; Wofford and Evans 1979a). Reported by Stupka (1964) as outside GRSM
Urtica procera Muh. - Chilhowee (T)
Vaccinium atrococcum (Gray) Heller - Sw (R)

[Appendix IV - Toward a Five-County Flora - continued]

Vaccinium corymbosum L. - H, Sw (R)

Vaccinium macrocarpan Ait. - H (R)

Valerianella umbilicata (Sullivant) Wood - Sw (R)

Verbena simplex Lehmann - Chilhowee (T)

Veronica hедераefolia L. - H (R)

Viola palmata L. - Sw (R)

Viola septentrionalis Greene - Chilhowee (T)

Vida walteri House - H (R)

Xanthium chinense Miller - Chilhowee (T)

Xerophyllum asphodeloides (L.) Nutt - Chilhowee (T; Committee for
Tennessee Rare Plants 1978).

Zizia aurea (L.) WDJ Koch - H, Sw.(R)

APPENDIX V

A CHECKLIST OF THE WOODY PLANTS OF
GREAT SMOKY MOUNTAINS NATIONAL PARK

The woody plants of GRSM are listed below in five categories:
Trees, Small Trees, Shrubs, Subshrubs, and Woody Vines. Exotic
species are designated with an asterisk (*).

[Appendix V - Woody Plants of GRSM - continued]

TREES:

Abies fraseri (Pursh.) Poir.
Acer negundo L.
 **Acer platanoides* L.
Acer rubrum L. var. *rubrum*
Acer rubrum var. *trilobum* K. Koch
Acer saccharum Marsh.
Aesculus octandra Marsh.
 **Ailanthus altissima* (Mill.) Swingle
 **Albizia julibrissin* Durrazzini
Betula cordifolia Regel
Betula lenta L.
Betula lutea Michaux f.
Betula nigra L.
 **Betula pendula* Roth.
Carpinus caroliniana Walt.
Carya cordiformis (Wang.) K. Koch
Carya glabra (Mill.) Sweet
 **Carya illinoensis* Wang.) Koch
Carya ovalis (Mill.) Sarg.
Carya ovata (Mill.) K. Koch
Carya pallida (Asne) Engl. & Graebn.
Carya tomentosa Nutt.
Castanea dentata (Marsh.) Borkh.
 **Castanea mollissima* Bl.
 **Catalpa speciosa* Warder
Celtis laevigata Willd.
Celtis occidentalis L.
Cladrastis kentukea (Dum-Cours.) Rudd
Diospyrus virginiana L.
Fagus grandifolia Ehrh. var.
 grandifolia
Fagus grandifolia var. *caroliniana*
 Fern.
Fraxinus americana L. var. *americana*
Fraxinus americana var. *biltmoreana*
 (Beadle) J. Wright
Fraxinus pennsylvanica Marsh. var.
 pennsylvanica
Fraxinus pennsylvanica var.
 subintegerrima (Vahl.) Fern
Gleditsia triacanthos L.
 **Gymnocladus dioica* (L.) K. Koch
Halesia carolina L.
Juglans cinerea L.
 **Juglans mandshurica* Maxim.
Juglans nigra L.
Juniperus virginiana L.
Liquidambar styraciflua L.
Liriodendron tulipifera L.

[Trees:]

Magnolia acuminata L.
Magnolia acummata f. *aurea* (Ashe)
 Hardin
Magnolia fraseri Walt.
 **Magnolia grandiflora* L.
Magnolia macrophylla Michx.
Magnolia tripetala L.
Nyssa sylvatica Marsh.
Ostrya virginiana (Mill.) K. Koch
Oxydendrum arboreum (L.) DC
 **Paulownia tomentosa* (Thunb.) Stend.
 **Picea abies* (L.) Karst
Picea rubens Sarg.
Pinus echinata Mill.
 **Pinus palustris* Miller
Pinus pungens Lamb.
Pinus rigida Mill.
Pinus strobus L.
Pinus virginiana Mill.
Platanus occidentalis L.
 **Populus alba*.
 **Populus candicans* Aiton
 **Populus canescens* Sm.
 **Populus deltoides* Marsh.
 **Populus nigra* L. var. *italica*
 Muench.
Prunus pensylvanica L.f.
Prunus serotina Ehrh.
Quercus alba L.
Quercus coccinea Muenchh.
Quercus falcata Michx.
Quercus imbricaria Michx.
Quercus marilandica Muenchh.
Quercus muhlenbergii Engelm.
Quercus muhlenbergii Engelm. f.
 alexanderi Trel.
Quercus prinus L.
Quercus rubra L.
Quercus stellata Wang.
Quercus velutina Lam.
Robinia pseudo-acacia L.
 **Salix alba* L.
 **Salix babylonica* L.
Salix caroliniana Michx.
Salix nigra Marsh.
Sassafras albidum (Nutt.) Nees
 **Thuja occidentalis* L.
 **Thuja orientales* L.
Tilia americana L.

[Appendix V - Woody Plants of GRSM - continued]

[Trees:]

Tilia heterophylla Vent.
Tsuga canadensis (L.) Carr.
Ulmus alata Michx.
Ulmus americana L.
Ulmus rubra Muhl.

SMALL TREES:

Acer pensylvanicum L.
Acer spicatum Lam.
Alnus serrulata (Ait.) Willd.
Amelanchier arborea (Michx. f.)
 Fern.
Amelanchier laevis Wieg.
Amelanchier sanguinea (Pursh.) DC
Aralia spinosa L.
Asimina triloba (L.) Dunal
Celtis tenuifolia Nutt.
Cercis canadensis L.
Cornus florida L.
Crataegus biltmoreana Beadle
Crataegus boyntonii Beadle
Crataegus calpodendron Medic.
Crataegus collina Chapm.
Crataegus crus-galli L.
Crataegus deltoides Ashe
Crataegus gattingeri Ashe
Crataegus macrosperma Ashe
Crataegus palmeri Sarg.
Crataegus pinetorum Beadle
Hamamelis virginiana L.
Ilex opaca Ait.
 **Maclura pomifera* (Raf.) Schneid.
Malus angustifolia Michx.
 **Malus pumila* Mill.
 **Morus alba* L.
Morus rubra L.
Prunus americana Marsh.
Prunus angustifolia Pursh.
 **Prunus avium* L.
 **Prunus cerasus* L.
Prunus hortulana Bailey
 **Prunus munsoniana* Wight & Hedrick
 **Prunus persica* (L.) Batsch.
 **Pyrus communis* L.
Sorbus americana Marsh.

SHRUBS:

Amorpha fruticosa L.
Amorpha glabra Desf.
Aronia arbutifolia (L.) Ell.
Aronia atropurpurea Britt.
Aronia melanocarpa (Michx.) Ell.
Arundinaria gigantea (Walt.)
 Muhl.
Ascyrum hypericoides L. var
 hypericoides
Ascyrum hyperidoices var.
 multicaule (Michx.) Fern.
 **Berberis thunbergii* var.
 atropurpurea Chenault
 **Berberis thunbergii* DC var.
 thunbergii
 **Berberis vulgaris* L.
 **Buxus sempervirens* L.
Callicarpa americana L.
Calycanthus floridus var.
 laevigatus (Willd.) Turr. & Gray
Castanea pumila (L.) Mill.
Ceanothus americanus L.
Cephalanthus occidentalis L.
 **Chaenomeles lagenaria* (Loisel.) Koidz
Chionanthus virginicus L.
Clethra acuminata Michx.
Cornus alternifolia L. f.
Cornus amomum Mill.
Corylus americana Walt.
Corylus cornuta Marsh.
 **Cytisus scoparius* (L.) Link
Diervilla sessilifolia Buckl.
Hydrangea arborescens L. ssp.
 arborescens
Hydrangea arborescens ssp.
 discolor (Seringe) McClintock
 **Hydrangea paniculata* Siebold
Hydrangea radiata Walter
Euonymus americanus L.
Euonymus atropurpureus Jacq.
Euonymus obovatus Nutt.
 **Forsythia suspensa* (Thunb.) Vahl
 **Forsythia viridissima* Lindl.
Gaylussacia baccata (Wang.) K. Koch
Gaylussacia ursina (MA Curtis)
 T.&G. ex. Gray
 **Hibiscus syriacus* L.
Hypericum densiflorum Pursh

[Appendix V - Woody Plants of GRSM - continued]

[Shrubs:]

Ilex beadlei Ashe
Ilex collina Alex.
Ilex montana T.&G.
Ilex verticillata (L.) Gray
Itea virginica L.
Kalmia latifolia L.
 **Kerria japonica* (L.) DC
Leiophyllum buxifolium var.
 prostratum (Loudon) Gray
 **Lespedeza bicolor* Turcs.
Leucothoe fontanesiana (Stend.)
 Sleumer
Leucothoe recurva (Buckley)
 Gray
 **Ligustrum vulgare* L.
Lindera benzoin (L.) Blume
Lonicera canadensis Marsh.
 **Lonicera korolkowii* Stapf.
 **Lonicera morrowii* Gray
Lyonia ligustrina (L.) DC
Menziesia pilosa (Michx.) Juss.
Philadelphus hirsutus var.
 nanus Nutt.
Philadelphus inodorus var.
 grandiflorus (Willd.) Gray
Philadelphus inodorus var.
 strigosus Beadle
Philadelphus sharpianus Hu.
Phoradendron flavescens (Pursh.)
 Nutt.
Physocarpus opulifolius (L.)
 Maxim.
Pieris floribunda (Pursh.) B.&H.
Prunus virginiana L.
Pyrularia pubera Michx.
Rhamnus caroliniana Walt.
Rhododendron arborescens
 (Pursh.) Torr.
Rhododendron bakeri (Lemon &
 McKay) Hume
Rhododendron calendulaceum
 (Michx.) Torr.
Rhododendron catawbiense Michx.
Rhododendron maximum L.
Rhododendron minus Michx.
Rhododendron nudiflorum (L.) Torr.
Rhododendron roseum (Loisel.) Rehd.
Rhododendron viscosum (L.) Torr.

[Shrubs:]

Rhus copallina L. var. *copallina*
Rhus copallina var. *latifolia*
 Engler.
Rhus glabra L.
Rhus typhina L.
Ribes cynosbati L.
Ribes glandulosum Grauer
 **Ribes odoratum* Wendl.
Ribes rotundifolium Michx.
Robinia boyntonii Ashe
Robinia hispida L.
Robinia kelseyi Hutchison
Rosa arkansana Porter
 **Rosa canina* L.
Rosa carolina L.
 **Rosa centrifolia* L.
 **Rosa eglanteria* L.
 **Rosa multiflora* Thunberg
Rosa palustris Marsh.
Rosa setigera Michx.
 **Rosa wichuraiana* Crepin
Rubus allegheniensis Porter
Rubus alumnus Bailey
Rubus argutus Link
Rubus canadensis L.
Rubus enslenii Tratt.
Rubus flagellaris Willd.
Rubus hispidus L.
Rubus idaeus var. *canadensis*
 Richards
Rubus jennisonii Bailey
Rubus occidentalis L.
Rubus occidentalis f. *pallidus*
 Robins.
Rubus odoratus L.
 **Rubus phoenicolasius* Maxim.
Rubus trux Ashe
Salix humilis Marsh. var. *humilis*
Salix humilis var. *microphylla*
 (Anderss.) Fern.
Salix sericea Marsh.
Sambucus canadensis L.
Sambucus pubens Michx.
 **Sasa palmata* (Milford) E.G. Camus
 **Spiraea prunifolia* Sieb. & Zucc.
 **Spiraea vanhouttei* (Briot.) Zab.
Spiraea virginiana Britt.
Staphylea trifolia L.
Stewartia ovata (Cav.) Weath

[Appendix V - Woody Plants of GRSM - continued]

[Shrubs:]

*Symphoricarpos orbiculatus Moench.
 Symplococos tinctoria (L.) L'Her
 *Syringa vulgaris L.
 Vaccinium angustifolium Ait.
 Vaccinium arboreum Marsh.
 Vaccinium constablaei Gray
 Vaccinium erythrocarpum Michx.
 Vaccinium hirsutum Buckl.
 Vaccinium pallidum Ait.
 Vaccinium stamineum L. var. stamineum
 Vaccinium stamineum var. candicans
 (Small) Mohr.
 Vaccinium stamineum var. melanocarpa
 Mohr.
 Vaccinium stamineum var. neglectum
 (Small) Deam
 Vaccinium vacillans Torr.
 Viburnum acerifolium L.
 Viburnum alnifolium Marsh.
 Viburnum cassinoides L.
 Viburnum dentatum L.
 *Viburnum lantana L.
 *Viburnum opulus L.
 Viburnum prunifolium L.
 Viburnum rufidulum Raf.
 Xanthorhiza simplicissima Marsh.
 Yucca smalliana Fern.
 *Zanthoxylum americanum L.

[Vines:]

Clematis viorna L.
 Clematis virginiana L.
 Cocculus carolinus (L.) DC
 Decumaria barbara L.
 *Euonymus fortunei Hand.-Mazz.
 *Hedera helix L.
 *Lonicera japonica Thunb.
 *Lonicera sempervirens L.
 Menispermum canadense L.
 Parthenocissus quinquefolia (L.)
 Planch
 *Pueraria lobata (Willd.) Ohwi
 Rhus radicans L.
 Smilax bona-nox L.
 Smilax glauca (L.) Walt.
 Smilax rotundifolia L.
 Smilax tamnoides L. var. hispida
 Fern.
 Vitis aestivalis Michx.
 Vitis cinerea Englm. ex Millardet
 Vitis labrusca L.
 Vitis rotundifolia Michx.
 Vitis vulpina L.
 Wisteria frutescens (L.) Poir

SUBSHRUBS:

Chimaphila maculata (L.) Pursh.
 Epigaea repens L.
 Gaultheria procumbens L.
 Linnaea borealis L.
 Mitchella repens L.
 *Vinca minor L.

VINES:

*Ampelopsis arborea (L.) Koehne
 Ampelopsis cordata Michx.
 Aristolochia durior Hill
 Bignonia capreolata L.
 Campsis radicans (L.) Seem.
 *Celastrus orbiculatus Thunb.
 Celastrus scandens L.
 *Clematis dioscoreifolia var.
 robusta (Corr.) Rehd.

APPENDIX VI

A CHECKLIST OF EXOTIC PLANTS OF
GREAT SMOKY MOUNTAINS NATIONAL PARK

All exotic plants (designated by an asterisk [*] on the main checklist are listed here, alphabetically by genus. The following symbols have been used to indicate general status in the Park's flora:

- P -- Persistent after cultivation
- P+S -- Persistent after cultivation and spreading
- DP -- Formerly collected, but not rediscovered in several decades and, therefore, doubtfully persisting
- E -- Established or becoming established spontaneously in the flora

[Appendix VI - Exotic Plants of GRSM - continued]

<i>Acer platanoides</i> L.	P	ACERACEAE
<i>Achillea millefolium</i> L.	E	ASTERACEAE
<i>Acorus calamus</i> L.	P+S	ARACEAE
<i>Aegopodium podagraria</i> L.	P	APIACEAE
<i>Agropyron repens</i> (L.) Beauv.	E	POACEAE
<i>Agrostemma githago</i> L.	P+S	CARYOPHYLLACEAE
<i>Agrostis alba</i> L.	E	POACEAE
<i>Agrostis tenuis</i> sibthorp.	E	POACEAE
<i>Ailanthus altissima</i> (Mill) Swingle	E	SIMAROUBACEAE
<i>Ajuga reptans</i> L.	P+S	LAMIACEAE
<i>Albizia julibrissin</i> Durrazzini	E	FABACEAE
<i>Alchemilla microcarpa</i> Boiss. & Reut.	DP	ROSACEAE
<i>Allium vineale</i> L.	E	LILIACEAE
<i>Amaranthus albus</i> L.	E	AMARANTHACEAE
<i>Amaranthus hybridus</i> L.	E	AMARANTHACEAE
<i>Amaranthus retroflexus</i> L.	E	AMARANTHACEAE
<i>Amaranthus spinosus</i> L.	E	AMARANTHACEAE
<i>Ampelopsis arborea</i> (L.) Koehne	P+S	VITACEAE
<i>Aneleima keisak</i> Hasskarl	E	COMMELINACEAE
<i>Anthemis arvensis</i> L.	E	ASTERACEAE
<i>Anthemis cotula</i> L.	E	ASTERACEAE
<i>Anthoxanthum odoratum</i> L	E	POACEAE
<i>Aquilegia vulgaris</i> L.	P+S	RANUNCULACEAE
<i>Arabidopsis thaliana</i> (L.) Heynh.	E	BRASSICACEAE
<i>Arctium minus</i> (Hill) Bernh.	E	ASTERACEAE
<i>Arenaria serpyllifolia</i> L.	E	CARYOPHYLLACEAE
<i>Arrhenatherum elatius</i> (L.) Presl.	E	POACEAE
<i>Artemisia ludoviciana</i> var.		
<i>mexicana</i> (Willd.) Fern.	E	ASTERACEAE
<i>Artemisia vulgaris</i> L.	E	ASTERACEAE
<i>Asclepias syriaca</i> L.	E	ASCLEPIADACEAE
<i>Asparagus officinalis</i> L.	E	LILIACEAE
<i>Avena sativa</i> L.	DP	POACEAE
<i>Barbarea verna</i> (Mill.) Aschers	E	BRASSICACEAE
<i>Barbarea vulgaris</i> L.	E	BRASSICACEAE
<i>Belamcanda chinensis</i> (L.) DC	P+S	IRIDACEAE
<i>Berberis thunbergii</i> DC. var.		
<i>thunbergii</i>	P+S	BERBERIDACEAE
<i>Berberis thunbergii</i> var.		
<i>atropurpurea</i> Chenault	P+S	
<i>Berberis vulgaris</i> L.	DP	BERBERIDACEAE
<i>Betula pendula</i> Roth.	P	BETULACEAE
<i>Brassica juncea</i> var.		
<i>crispifolia</i> Bailey	E	BRASSICACEAE
<i>Brassica rapa</i> L.	E	BRASSICACEAE
<i>Bromus commutatus</i> Schrad.	E	POACEAE
<i>Bromus japonicus</i> Thundb.	E	POACEAE
<i>Bromus secalinus</i> L.	E	POACEAE

[Appendix VI - Exotic Plants of GRSM - continued]

<i>Bromus tectorum</i> L.	E	POACEAE
<i>Buxus sempervirens</i> L.	P	BUXACEAE
<i>Cannabis sativa</i> L.	E	CANNABACEAE
<i>Capsella bursa-pastoris</i> (L.) Medic.	E	BRASSICACEAE
<i>Cardamine hirsuta</i> L.	E	BRASSICACEAE
<i>Carya illinoensis</i> (Wang.) Koch	P	JUGLANDACEAE
<i>Castanea mollissima</i> Bl.	P+S	FAGACEAE
<i>Catalpa speciosa</i> Warder	P+S	BIGNONIACEAE
<i>Celastrus orbiculatus</i> Thunb.	P+S	CELASTRACEAE
<i>Centaurea cyanus</i> L.	DP	ASTERACEAE
<i>Cerastium brachypetalum</i> Pers.	E	CARYOPHYLLACEAE
<i>Cerastium glomeratum</i> Thuillier	E	CARYOPHYLLACEAE
<i>Cerastium holosteoides</i> var. vulgare (Hartman) Hylander	E	CARYOPHYLLACEAE
<i>Chaenomeles lagenaria</i> (Loisel.) Koidz.	P	ROSACEAE
<i>Chenopodium album</i> L.	E	CHENOPODIACEAE
<i>Chenopodium ambrosioides</i> L.	E	CHENOPODIACEAE
<i>Chenopodium murale</i> L.	E	CHENOPODIACEAE
<i>Chrysanthemum leucanthemum</i> var. pinnatifidum Lecoq. & Lamotte	E	ASTERACEAE
<i>Cichorium intybus</i> L.	E	
<i>Cirsium arvense</i> (L.) Scop.	E	ASTERACEAE
<i>Cirsium vulgare</i> (Sav.) Tenure	E	ASTERACEAE
<i>Clematis dioscoreifolia</i> var. robusta (Corr.) Rehd.	E	RANUNCULACEAE
<i>Cleome houtteana</i> Raf.	E	CAPPARIDACEAE
<i>Commelina communis</i> L.	E	COMMELINACEAE
<i>Conringia orientalis</i> (L.) Dum.	E	BRASSICACEAE
<i>Convallaria majalis</i> L.	P+S	LILIACEAE
<i>Coreopsis tinctoria</i> Nutt.	P	ASTERACEAE
<i>Coronilla varia</i> L.	P+S	FABACEAE
<i>Crepis capillaris</i> (L.) Wallr.	E	ASTERACEAE
<i>Cynodon dactylon</i> (L.) Pers.	E	POACEAE
<i>Cytisus scoparius</i> (L.) Link	P	FABACEAE
<i>Dactylis glomerata</i> L.	E	POACEAE
<i>Datura stramonium</i> L.	E	SOLANACEAE
<i>Daucus carota</i> L.	E	APIACEAE
<i>Delphinium ambiguum</i> L.	DP	RANUNCULACEAE
<i>Dianthus armeria</i> L.	E	CARYOPHYLLACEAE
<i>Dianthus barbatus</i> L.	DP	CARYOPHYLLACEAE
<i>Digitalis purpurea</i> L.	DP	SCROPHULARIACEAE
<i>Digitaria ischaemum</i> (Schreb.) Schreb. ex Muhl.	E	POACEAE
<i>Digitaria sanguinalis</i> (L.) Scop.	E	POACEAE
<i>Dioscorea batatas</i> Dcne.	E	DIOSCOREACEAE
<i>Dipsacus sylvestris</i> Huds.	P+S	DIPSACACEAE

[Appendix VI - Exotic Plants of GRSM - continued]

<i>Draba verna</i> L.	E	BRASSICACEAE
<i>Duchesnea indica</i> (Andr.) Focke	E	ROSACEAE
<i>Echinochloa colonum</i> (L.) Link	E	POACEAE
<i>Echinochloa crusgallii</i> (L.) Beauv.	E	POACEAE
<i>Echium vulgare</i> L.	E	BORAGINACEAE
<i>Elusine indica</i> (L.) Gaertn.	E	POACEAE
<i>Erodium cicutarium</i> (L.) Her.	E	GERANIACEAE
<i>Erysimum cheiranthoides</i> L	E	BRASSICACEAE
<i>Euonymus fortunei</i> Hand.-Mazz.	P+S	CELASTRACEAE
<i>Fagopyrum esculentum</i> Moench	DP	POLYGONACEAE
<i>Festuca elatior</i> L.	E	POACEAE
<i>Festuca ovina</i> L.	P+S	POACEAE
<i>Festuca rubra</i> L.	P+S	POACEAE
<i>Forsythia suspensa</i> (Thunb.) Vahl	P	OLEACEAE
<i>Forsythia viridissima</i> Lindl.	P	OLEACEAE
<i>Galinsoga quadriradiata</i> Ruiz & Pavon	E	ASTERACEAE
<i>Galium pedemontanum</i> All.	E	RUBIACEAE
<i>Geranium columbinum</i> L.	E	GERANIACEAE
<i>Geranium molle</i> L.	E	GERANIACEAE
<i>Gladiolus gandovensis</i> Van Houtte	P	IRIDACEAE
<i>Glechoma hederacea</i> L.	E	LAMIACEAE
<i>Gymnocladus dioica</i> (L.) K. Koch	P	FABACEAE
<i>Hedera helix</i> L.	P+S	ARALIACEAE
<i>Hemerocallis fulva</i> L.	P+S	LILIACEAE
<i>Hibiscus syriacus</i> L.	P	MALVACEAE
<i>Hieracium aurantiacum</i> L.	E	ASTERACEAE
<i>Hieracium florentinum</i> All.	E	ASTERACEAE
<i>Hieracium pilosella</i> L.	E	ASTERACEAE
<i>Hieracium pratense</i> Tausch	E	ASTERACEAE
<i>Holcus lanatus</i> L.	E	POACEAE
<i>Hydrangea paniculata</i> Siebold.	P	SAXIFRAGACEAE
<i>Hydrocotyle sibthorpioides</i> Lam.	E	APIACEAE
<i>Hypericum perforatum</i> L.	E	HYPERICACEAE
<i>Hypochoeris radicata</i> L.	E	ASTERACEAE
<i>Ipomoea coccinea</i> L.	E	CONVOLVULACEAE
<i>Ipomoea hederacea</i> (L.) Jacq.	E	CONVOLVULACEAE
<i>Ipomoea purpurea</i> (L.) Roth	E	CONVOLVULACEAE
<i>Iris laevigata</i> Fisch.	P	IRIDACEAE
<i>Juglans mandshurica</i> Maxim.	DP	JUGLANDACEAE
<i>Kera japonica</i> (L.) DC.	P	ROSACEAE
<i>Lactuca serriola</i> L	E	ASTERACEAE
<i>Lamium amplexicaule</i> L.	E	LAMIACEAE
<i>Lamium purpureum</i> L.	E	LAMIACEAE
<i>Lapsana communis</i> L.	E	ASTERACEAE
<i>Lathyrus latifolius</i> L.	E	FABACEAE
<i>Leonuris cardiaca</i> L.	DP	LAMIACEAE

[Appendix VI - Exotic Plants of GRSM - continued]

<i>Lepidium campestre</i> (L.) R. Br.	E	BRASSICACEAE
<i>Lespedeza bicolor</i> Turcz.	P+S	FABACEAE
<i>Lespedeza cuneata</i> (Dumont) G. Don	E	FABACEAE
<i>Lespedeza stipulacea</i> Maxim.	E	FABACEAE
<i>Lespedeza striata</i> (Thunb.) H.&A.	E	FABACEAE
<i>Ligustrum vulgare</i> L.	P+S	OLEACEAE
<i>Lilium tigrinum</i> L.	P	LILIACEAE
<i>Linaria vulgaris</i> Hill	E	SCROPHULARIACEAE
<i>Lithospermum arvense</i> L.	E	BORAGINACEAE
<i>Lolium multiflorum</i> Lam.	E	POACEAE
<i>Lolium perenne</i> L.	E	POACEAE
<i>Lonicera japonica</i> Thunb.	E	CAPRIFOLIACEAE
<i>Lonicera korolkowii</i> Stapf.	P	CAPRIFOLIACEAE
<i>Lonicera morrowii</i> Gray	P+S	CAPRIFOLIACEAE
<i>Lonicera sempervirens</i> L.	P+S	CAPRIFOLIACEAE
<i>Lunaria annua</i> L.	P+S	BRASSICACEAE
<i>Lychnis alba</i> Mill.	E	CARYOPHYLLACEAE
<i>Lychnis coronaria</i> (L.) Dest.	E	CARYOPHYLLACEAE
<i>Lycopersicon esculentum</i> Miller	DP	SOLANACEAE
<i>Lysimachia nummularia</i> L.	E	PRIMULACEAE
<i>Maclura pomifera</i> (Raf.) Schneid.	DP	MORACEAE
<i>Magnolia grandiflora</i> L.	DP	MAGNOLIACEAE
<i>Malus pumila</i> Mill.	P+S	ROSACEAE
<i>Malva neglecta</i> Wallr.	E	MALVACEAE
<i>Malva sylvestris</i> L.	E	MALVACEAE
<i>Matricaria matricarioides</i> (Lessing) Porter	E	ASTERACEAE
<i>Mazus japonicus</i> (Thunb.) Ktze.	E	SCROPHULARIACEAE
<i>Medicago lupulina</i> L.	E	FABACEAE
<i>Melilotus alba</i> Desr.	E	FABACEAE
<i>Melilotus officinalis</i> (L.) Lam.	E	FABACEAE
<i>Melissa officinalis</i> L.	DP	LAMIACEAE
<i>Mentha piperita</i> L.	E	LAMIACEAE
<i>Mentha spicata</i> L.	E	LAMIACEAE
<i>Microstegium vimineum</i> (Trin.) A. Camus	E	POACEAE
<i>Mirabilis jalapa</i> L.	DP	NYCTAGINACEAE
<i>Miscanthus sinensis</i> var. gracillimus Hitchc.	E	POACEAE
<i>Mollugo verticillata</i> L.	E	AIZOACEAE
<i>Morus alba</i> L.	DP	MORACEAE
<i>Muscari botryoides</i> (L.) Miller	P+S	LILIACEAE
<i>Myosotis scorpioides</i> L.	P+S	
<i>Narcissus pseudo-narcissus</i> L.	P+S	AMARYLLIDACEAE
<i>Nasturtium officinale</i> R.Br.	E	BRASSICACEAE
<i>Nepeta cataria</i> L.	P+S	LAMIACEAE
<i>Nicandra physalodes</i> (L.) Pers.	E	SOLANACEAE
<i>Nuphar advena</i> (Ait.) Ait.f.	DP	NYMPHAEACEAE
<i>Nymphaea odorata</i> Ait.	DP	NYMPHAEACEAE

[Appendix VI - Exotic Plants of GRSM -continued]

<i>Oenothera speciosa</i> Nutt.	E	ONAGRACEAE
<i>Ornithogalum umbellatum</i> L.	P+S	LILIACEAE
<i>Panicum milaceum</i> L.	E	POACEAE
<i>Paspalum dilatatum</i> Poir.	E	POACEAE
<i>Paspalum urvillei</i> Steud.	E	POACEAE
<i>Pastinaca sativa</i> L.	E	APIACEAE
<i>Paulownia tomentosa</i> (Thunb.) Steud.	E	SCROPHULARIACEAE
<i>Penstemon digitalis</i> Nutt.	DP	SCROPHULARIACEAE
<i>Perilla frutescens</i> (L.) Britt.	E	LAMIACEAE
<i>Phleum pratense</i> L.	E	POACEAE
<i>Phlox drummondii</i> Hooker	DP	POLEMONIACEAE
<i>Phlox subulata</i> L.	P	POLEMONIACEAE
<i>Picea abies</i> (L.) Karst	P+S	PINACEAE
<i>Pinus palustris</i> Miller	P	PINACEAE
<i>Plantago lanceolata</i> L.	E	PLANTAGINACEAE
<i>Poa annua</i> L.	E	POACEAE
<i>Poa compressa</i> L.	E	POACEAE
<i>Poa pratensis</i> L.	E	POACEAE
<i>Polemonium reptans</i> L.	P	POLEMONIACEAE
<i>Polygonum convolvulus</i> L.	E	POLYGONACEAE
<i>Polygonum cuspidatum</i> Siebold & Zucc.	E	POLYGONACEAE
<i>Polygonum orientale</i> L.	E	POLYGONACEAE
<i>Polygonum persicaria</i> L.	E	POLYGONACEAE
<i>Populus alba</i> L.	P	SALICACEAE
<i>Populus candicans</i> Aiton	P	SALICACEAE
<i>Populus canescens</i> Sm.	P	SALICACEAE
<i>Populus deltoides</i> Marsh.	P	SALICACEAE
<i>Populus nigra</i> var. <i>italica</i> Muenchh.	P	SALICACEAE
<i>Portulaca oleracea</i> L.	E	PORTULACACEAE
<i>Potentilla anserina</i> L.	E	ROSACEAE
<i>Potentilla recta</i> L.	E	ROSACEAE
<i>Prunus avium</i> L.	P+S	ROSACEAE
<i>Prunus cerasus</i> L.	P	ROSACEAE
<i>Prunus munsoniana</i> Wight & Hedrick	E	ROSACEAE
<i>Prunus persica</i> (L.) Batsch.	P	ROSACEAE
<i>Pueraria lobata</i> (Willd.) Ohwi	P+S	FABACEAE
<i>Pyrus communis</i> L.	P	ROSACEAE
<i>Ranunculus acris</i> L.	E	RANUNCULACEAE
<i>Ranunculus bulbosus</i> L.	E	RANUNCULACEAE
<i>Ranunculus parviflorus</i> L.	E	RANUNCULACEAE
<i>Ranunculus repens</i> L.	E	RANUNCULACEAE
<i>Ribes odoratum</i> Wendl.	P	SAXIFRAGACEAE
<i>Rosa canina</i> L.	P	ROSACEAE
<i>Rosa centrifolia</i> L.	P	ROSACEAE
<i>Rosa eglanteria</i> L.	P	ROSACEAE
<i>Rosa multiflora</i> Thunberg	P+S	ROSACEAE
<i>Rosa wichuraiana</i> Crepin	P+S	ROSACEAE

[Appendix VI - Exotic Plants of GRSM - continued]

<i>Rubus phoenicolasius</i> Michx.	E	ROSACEAE
<i>Rudbeckia hirta</i> L. var. <i>hirta</i>	E	ASTERACEAE
<i>Rudbeckia hirta</i> var. <i>pulcherrima</i> Farw.	E	ASTERACEAE
<i>Rumex acetosella</i> L.	E	POLYGONACEAE
<i>Rumex crispus</i> L.	E	POLYGONACEAE
<i>Rumex obtusifolius</i> L.	E	POLYGONACEAE
<i>Sagina decumbens</i> (Ell.) T.&G.	E	CARYOPHYLLACEAE
<i>Salix alba</i> L.	P	SALICACEAE
<i>Salix babylonica</i> L.	P	SALICACEAE
<i>Saponaria officinalis</i> L.	E	CARYOPHYLLACEAE
<i>Sasa palmata</i> (Milford) E.G. Camus	P+S	POACEAE
<i>Satureja vulgaris</i> (L.) Fritsch	E	LAMIACEAE
<i>Secale cereale</i> L.	DP	POACEAE
<i>Sedum acre</i> L.	P+S	CRASSULACEAE
<i>Sedum sarmentosum</i> Bunge	P+S	CRASSULACEAE
<i>Sedum spectabile</i> Bureau	P+S	CRASSULACEAE
<i>Sedum telephium</i> L.	P+S	CRASSULACEAE
<i>Setaria faberi</i> Hermann	E	POACEAE
<i>Setaria geniculata</i> (Lam.) Beauv.	E	POACEAE
<i>Setaria glauca</i> (L.) Beauv.	E	POACEAE
<i>Setaria viridis</i> (L.) Beauv.	E	POACEAE
<i>Sherardia arvensis</i> L.	E	RUBIACEAE
<i>Sida spinosa</i> L.	E	MALVACEAE
<i>Silene cucubalus</i> Wibel	E	CARYOPHYLLACEAE
<i>Sisymbrium officinale</i> (L.) Scop.	E	BRASSICACEAE
<i>Sonchus asper</i> (L.) Hill	E	ASTERACEAE
<i>Sorghum halepense</i> (L.)	E	POACEAE
<i>Spiraea prunifolia</i> Sieb. & Zucc.	P	ROSACEAE
<i>Spiraea vanhouttei</i> (Briot.) Zab.	P	ROSACEAE
<i>Sporobolus poiretii</i> (R.&S.) Hitchc.	E	POACEAE
<i>Stellaria graminea</i> L.	E	CARYOPHYLLACEAE
<i>Stellaria media</i> (L.) Cyrillo	E	CARYOPHYLLACEAE
<i>Symphoricarpos orbiculatus</i> Moench.	P+S	CAPRIFOLIACEAE
<i>Syringa vulgaris</i> L.	P	OLEACEAE
<i>Taraxacum erythrospermum</i> Andrez. ex Besser.	E	ASTERACEAE
<i>Taraxacum officinale</i> Weber	E	ASTERACEAE
<i>Thlaspi perfoliatum</i> L.	E	BRASSICACEAE
<i>Thuja occidentalis</i> L.	P	CUPRESSACEAE
<i>Thuja orientalis</i> L.	P	CUPRESSACEAE
<i>Torilis japonica</i> (Houtt) DC.	E	APIACEAE
<i>Trifolium agrarium</i> L.	E	FABACEAE
<i>Trifolium campestre</i> Schreb.	E	FABACEAE
<i>Trifolium dubium</i> Sibthorp.	E	FABACEAE
<i>Trifolium hybridum</i> L.	E	FABACEAE
<i>Trifolium incarnatum</i> L.	E	FABACEAE
<i>Trifolium pratense</i> L.	E	FABACEAE

[Appendix VI - Exotic Plants of GRSM - continued]

<i>Trifolium repens</i> L.	E	FABACEAE
<i>Triticum aestivum</i> L.	DP	POACEAE
<i>Verbascum blattaria</i> L.	E	SCROPHULARIACEAE
<i>Verbascum thapsus</i> L.	E	SCROPHULARIACEAE
<i>Verbena brasiliensis</i> Vell.	E	VERBENACEAE
<i>Veronica arvensis</i> L.	E	SCROPHULARIACEAE
<i>Veronica officinalis</i> L.	E	SCROPHULARIACEAE
<i>Veronica persica</i> Poir.	E	SCROPHULARIACEAE
<i>Veronica serpyllifolia</i> L.	E	SCROPHULARIACEAE
<i>Viburnum lantana</i> L.	P+S	CAPRIFOLIACEAE
<i>Viburnum opulus</i> L.	P	CAPRIFOLIACEAE
<i>Vicia angustifolia</i> Reichard	E	FABACEAE
<i>Vicia dasycarpa</i> Tenure	E	FABACEAE
<i>Vicia villosa</i> Roth	E	FABACEAE
<i>Vinca minor</i> L.	P+S	APOCYNACEAE
<i>Viola odorata</i> L.	P+S	VIOLACEAE
<i>Viola rafinesquii</i> Greene	E	VIOLACEAE
<i>Xanthium strumarium</i> L.	E	ASTERACEAE
<i>Zanthoxylum americanum</i> L.	P	RUTACEAE

APPENDIX VII

EXOTIC SPECIES KNOWN ONLY IN CULTIVATION
AT DEVELOPED AREAS (AROUND GOVERNMENT BUILDINGS
AND RESIDENCES) AND AT PRIVATE INHOLDINGS
(e.g., ELKMONT)

Not all specimens could be definitely determined to species because flowering material was lacking. Some plants are included here which are also listed in the main checklist because they are spreading by seed (e.g., Berberis thunbergii) or are known from stations outside developed areas and are likely to be encountered by botanists (e.g., those persistent at old homesites such as Buxus sempervirens).

[Appendix VII - Exotic Species in Developed Areas - continued]

Species	Family	Locale	Origin
<i>Abelia grandiflora</i> Rehd.	CAPRIFOLIACEAE	Twin Creeks	E. Asia
<i>Abies</i> sp.	PINACEAE	Twin Creeks	
<i>Abies concolor</i> Hoopes	PINACEAE	Twin Creeks	W. US
<i>Acanthopanax sieboldianus</i> Makino	ARALIACEAE	Twin Creeks	E. Asia
<i>Acer palmatum</i> var. dissectum Mey.	ACERACEAE	Twin Creeks	E. Asia
<i>Acer palmatum</i> Thunb. var palmatum	ACERACEAE	Twin Creeks	E. Asia
<i>Astilbe japonica</i> Gray	SAXIFRACAEAE	Elkmont	E. Asia
<i>Berberis julianae</i> Schneid.	BERBERIDACEAE	Sugarlands	E. Asia
<i>Berberis thunbergii</i> var. atropurpurea Chenault ¹	BERBERIDACEAE	Twin Creeks	E. Asia
<i>Berberis thunbergii</i> DC var. thunbergii ¹	BERBERIDACEAE	Twin Creeks	E. Asia
<i>Betula pendula</i> Roth ²	BETULACEAE	441 Overlook	Eurasia
<i>Buxus sempervirens</i> L. ²	BUXACEAE	Twin Creeks	Eurasia
<i>Castanea mollissima</i> Blume ¹	FACACEAE	Twin Creeks	E. Asia
<i>Celastrus orbiculatus</i> Thunb. ¹	CELASTRACEAE	Twin Creeks Sugarlands	E. Asia
<i>Chaenomeles japonica</i> Lindl. ²	ROSACEAE	Twin Creeks	E Asia
<i>Clematis</i> spp.	RANUNCULACEAE	Elkmont Cataloochee	
<i>Convallaria majalis</i> L. ²	LILIACEAE	Twin Creeks	Europe
<i>Cornus florida</i> var. rubra West	CORNACEAE	Twin Creeks	E. US
<i>Cunninghamia lanceolata</i> Hook	CUPRESSACEAE	Twin Creeks	E. Asia
<i>Dianthus sylvestris</i> var. subcaulis Koch	CARYOPHYLLACEAE	Twin Creeks	Europe
<i>Euonymus fortunei</i> Hand.-Mazz. ¹	CELASTRACEAE	Twin Creeks	E. Asia
<i>Euonymus japonicus</i> L.	CELASTRACEAE	Twin Creeks	E. Asia
<i>Hedera helix</i> L. ¹	ARALIACEAE	Twin Creeks	Europe

[Appendix VII - Exotic Species in Developed Areas - continued]

Species	Family	Locale	Origin
<i>Hosta</i> sp.	LILIACEAE	Twin Creeks	
<i>Iris</i> sp.	IRIDACEAE	Twin Creeks	
<i>Juniperus chinensis</i> L.	CUPRESSACEAE	Twin Creeks	E. Asia
<i>Lagerstroemia indica</i> L.	LYTHRACEAE	Twin Creeks	Australasia
<i>Ligustrum</i> spp.	OLEACEAE	Elkmont	
<i>Lonicera</i> spp.	CAPRIFOLICEAE	Twin Creeks	
<i>Lonicera fragrantissima</i> Lindl. & Paxt.	CAPRIFOLIACEAE	Twin Creeks	E. Asia
<i>Lunaria annua</i> L. ¹	BRASSICACEAE	Twin Creeks	Eurasia
<i>Magnolia stellata</i> Maxim	MAGNOLIACEAE	Twin Creeks Elkmont	E. Asia
<i>Malus pumila</i> Mill. ¹	ROSACEAE	Twin Creeks Elkmont	Eurasia
<i>Nandina domestica</i> Thunb.	BERBERIDACEAE	Twin Creeks	E. Asia
<i>Ornithogalum umbellatum</i> L. ¹	LILIACEAE	Twin Creeks	Europe
<i>Paeonia officinalis</i> L.	RANUNCULAEAE	Twin Creeks	Eurasia
<i>Philadelphus inodorus</i> var. <i>grandiflorus</i> (Willd.) Gray ²	SAXIFRACEAE	Twin Creeks	E. US
<i>Phlox subulata</i> L. ²	POLEMONIACEAE	Twin Creeks Elkmont Twenty Mile	E. US
<i>Picea abies</i> (L.) Karst ¹	PINACEAE	Twin Creeks	Europe
<i>Picea glauca</i> Voss.	PINACEAE	Twin Creeks	No. America
<i>Rhododendron flavum</i> Don	ERICAEAE	Twin Creeks	Eurasia
<i>Rhododendron mucronatum</i> Don	ERICAEAE	Twin Creeks	E. Asia
<i>Rhododendron obtusum</i> Blanch	ERICAEAE	Twin Creeks	E. Asia
<i>Rhododendron pulexhrum</i> Sweet	ERICACEAE	Twin Creeks	Horticultural origin
<i>Rosa</i> spp.	ROSACEAE	Twin Creeks	E. Asia
<i>Rosa chinensis</i> Jacq.	ROSACEAE	Twin Creeks	E. Asia
<i>Rosa wichuraiana</i> Crepin ¹	ROSACEAE	Twin Creeks	Asia

[Appendix VII - Exotic Species in Developed Areas - continued]

Species	Family	Locale	Origin
<i>Scilla hispanica</i> Mill.	LILIACEAE	Twin Creeks	Europe
<i>Sedum</i> spp.	CRASSULACEAE	Twin Creeks Elkmont	
<i>Spiraea douglasii</i> Hook.	ROSACEAE	Twin Creeks	W. US
<i>Spiraea japonica</i> L.f.	ROSACEAE	Twin Creeks	E. Asia
<i>Spiraea margaritae</i> Zabel	ROSACEAE	Twin Creeks	Horticultural origin
<i>Spiraea vanhouttei</i> Zabel ²	ROSACEAE	Twin Creeks	Horticultural origin
<i>Taxus cuspidata</i> Sieb. & Zucc.	TAXACEAE	Twin Creeks	E. Asia
<i>Viburnum lantana</i> L. ¹	CAPRIFOLIACEAE	Twin Creeks	Eurasia
<i>Viburnum opulus</i> L. ²	CAPRIFOLIACEAE	Elkmont	Eurasia
<i>Vitex agnus-castus</i> L.	VERBENACEAE	Sugarlands	Europe
<i>Weigelia florida</i> A.DC.	CAPRIFOLIACEAE	Twin Creeks	E. Asia

Footnotes indicate plants on the main checklist:

¹Species spreading by seed.

²Species persistent after cultivation outside developed areas.



As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environment and cultural value of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.